

Public Draft
Environmental Assessment
for Post-2200 (10:00 P.M.) High
Explosive Ordnance Expenditure and
Supersonic Flights

Chocolate Mountain Aerial Gunnery Range, Imperial And Riverside Counties, California

June 2018

Prepared for: United States Department of the Navy



1 2 3 4 5 6	СНОСО	Public Draft ENVIRONMENTAL ASSESSMENT 00 P.M.) HIGH EXPLOSIVE ORDNANCE EXPENDITURE AND SUPERSONIC FLIGHTS OLATE MOUNTAIN AERIAL GUNNERY RANGE, IAL AND RIVERSIDE COUNTIES, CALIFORNIA
7	Action Proponent:	United States Marine Corps
8 9	Title of Proposed Action:	Post-2200 (10:00 P.M.) High Explosive Ordnance Expenditure and Supersonic Flights
10	Project Location:	Imperial and Riverside Counties, California
11	Document Type:	Environmental Assessment
12		Abstract
13 14 15 16 17 18 19 20 21 22 23 24	in accordance with the Nation as implemented by the Coun [CFR] §§ 1500-1508); Depart Marine Corps Order P5090. Protection Manual, which eliminate schedule restriction Chocolate Mountain Aerial G flight in the existing airspace facilitate maintaining USMC contingency and wartime re-	ent (EA) has been prepared by the United States (U.S.) Marine Corps (USMC) al Environmental Policy Act (NEPA) of 1969 (42 U.S. Code §§ 4321-4370h), cil on Environmental Quality regulations (40 Code of Federal Regulations tement of the Navy regulations for implementing NEPA (32 CFR § 775); and 2A, Change 3, dated 26 August 2013, <i>Environmental Compliance and</i> establishes procedures for implementing NEPA. The USMC proposes to as on the delivery of high explosive ordnance at existing targets within the unnery Range (CMAGR). The USMC also proposes to authorize supersonic e overlying the CMAGR. Implementation of the Proposed Action would Aviation at an optimal state of readiness to support current and emerging quirements. This EA describes the potential environmental consequences matives (Alternatives 1 and 2) and the No-Action Alternative.
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32 **June 2018**

EXECUTIVE SUMMARY

1

- 2 The United States (U.S.) Marine Corps (USMC) has prepared this Environmental Assessment (EA) in
- accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code §§ 4321-4370h),
- 4 as implemented by the Council on Environmental Quality regulations (40 Code of Federal Regulations
- 5 [CFR] §§ 1500-1508); Department of the Navy procedures for implementing NEPA (32 CFR § 775); and
- 6 Marine Corps Order P5090.2A, Change 3, dated 26 August 2013, Environmental Compliance and
- 7 Protection Manual, which establishes USMC procedures for implementing NEPA.
- 8 Under the Proposed Action, the USMC proposes to eliminate schedule restrictions on the delivery of high
- 9 explosive (HE) ordnance at existing targets within the Chocolate Mountain Aerial Gunnery Range
- 10 (CMAGR). The USMC also proposes to authorize supersonic flight in the existing airspace overlying the
- 11 CMAGR. There would be no change to the existing targets, amount of HE used, or restricted airspace
- 12 boundaries under the Proposed Action. The Proposed Action would occur in the CMAGR, located within
- 13 Imperial and Riverside counties, California.
- 14 The purpose of the Proposed Action is to support the achievement of standardized, advanced tactical
- 15 training and certification of unit instructor qualifications that support Marine Aviation Training and
- 16 Readiness. The Proposed Action is needed because as currently restricted, HE ordnance training
- 17 requirements cannot be satisfied, which adversely impacts training ability and overall operational readiness.
- 18 The second purpose of the Proposed Action is to provide aviators the ability to train to the full capability
- of the aircraft, and to the tactics, techniques, and procedures that are part of Marine Aviation Training and
- 20 Readiness. The supersonic flight area is needed to facilitate the full exploitation of aircraft sensor suites.
- 21 Implementation of the Proposed Action would facilitate maintaining USMC and other forces at an optimal
- state of readiness to support current and emerging contingency and wartime requirements. Two action
- alternatives meet the purpose of and need for the Proposed Action: Alternative 1 and Alternative 2.
- 24 Alternative 1 consists of eliminating schedule restrictions on HE ordnance deployment year-round and
- 25 creating supersonic flight space within the CMAGR. Under Alternative 2, schedule restrictions on HE
- ordnance deployment would only be lifted during the biannual Marine Aviation Weapons and Tactics
- 27 Squadron One Weapons and Tactics Instruction Course; and supersonic flight space would also be created
- within the CMAGR. The No Action Alternative is also evaluated in this EA.
- 29 In accordance with NEPA, the USMC analyzed the following resource areas potentially affected by
- 30 implementation of the three alternatives: airspace and air traffic, noise, cultural resources, biological
- 31 resources, and public health and safety. Impacts to other resource areas are anticipated to be negligible or
- 32 non-existent from implementation of the alternatives, and as such have not been analyzed in detail.
- Table ES-1 presents a summary of the potential impacts to each resource area resulting from the
- *34* implementation of the alternatives.

Table ES-1. Summary of Environmental Consequences

Resource Area	Alternative 1	Alternative 2	No-Action Alternative
Resource Areas Eli	minated from Detailed Analysis		
Air Quality	A temporal shift in existing emissions; no new combustion-related emissions or fugitive dust emissions would occur. Supersonic flights would not result in any increase in aircraft afterburner use. Therefore, there would be no increase in criteria pollutant or greenhouse gas emissions. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.
Geological Resources	A temporal shift to existing geological resource impacts from HE ordnance delivery; no new impacts would occur. Supersonic flights would not affect geological resources because the activity would be entirely airspace-based. <i>Conclusion</i> : No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.
Water Resources	A temporal shift to existing water resource impacts from HE ordnance delivery; no new impacts would occur. Supersonic flights would not affect water resources because the activity would be entirely airspace-based. <i>Conclusion</i> : No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.
Hazardous Materials and Wastes	A temporal shift to the existing use/generation of hazardous materials and wastes; no new impacts would occur. All hazardous materials would continue to be managed and handled in accordance with applicable MCAS Yuma Environmental Standard Operating Procedures. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.
Land Use	No change to existing land use designations. No increase in noise levels that would be incompatible with existing land uses. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.
Recreation	No impact to the public's ability to recreate in existing recreational areas adjacent to the CMAGR. No increase in noise levels that would be incompatible with existing recreational uses. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.
Socioeconomics and Environmental Justice	No creation of new jobs or alteration of regional economic conditions. Conclusion: No Impact. No children are located within the CMAGR and public access is restricted. Noise levels would not exceed established thresholds at off-installation areas. Conclusion: No Disproportionate Impact to minority populations or the health and safety of children.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact; No Disproportionate Impact to minority populations or the health and safety of children.	No change from existing conditions. Conclusion: No Impact.

Table ES-1. Summary of Environmental Consequences

Resource Area	Alternative 1	Alternative 2	No-Action Alternative
Ground Transportation	No generation of additional vehicle trips or impact to the existing regional transportation network. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.
Utilities	No increase in utility demand or impact to existing regional utility infrastructure. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.
Visual Resources	No alteration of the existing visual setting of the project area and vicinity. Topography would visually screen off-installation areas from post-2200 (10:00 P.M.) HE ordnance expenditures. Supersonic flights would be visually consistent with existing aircraft activity. <i>Conclusion:</i> Negligible Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: Negligible Impact.	No change from existing conditions. Conclusion: No Impact.
Resource Areas An	alyzed in Detail		
Airspace and Air Traffic	No alteration of the existing configuration of the R-2507 airspace. No increase in number of sorties or in the type or amount of HE ordnance delivered at designated target areas at the CMAGR. No impact to regional air traffic. Supersonic flight operations would generally last no longer than approximately 2 minutes at an altitude above 25,000 feet. Conclusion: No Significant Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Significant Impact.	No change from existing conditions. Conclusion: No Impact.
Noise	Incremental increase in nighttime aircraft noise and ordnance delivery (explosions), and introduction of sonic booms. The combined effect of new noise would generate noise levels far below the threshold for community noise impacts within their respective noise metrics – while still within the range boundaries. Given that noise attenuates over distance, noise levels outside the CMAGR would be even lower. Conclusion: No Significant Impact.	Alternative 2 impacts would be slightly less than presented for Alternative 1. Conclusion: No Significant Impact.	No change from existing conditions. Conclusion: No Impact.
Cultural Resources	Current air-to-ground and air-to-air training within the project area avoids impacting known cultural resource sites; no new impacts would occur. Overpressures from sonic booms would not damage historic properties. Conclusion: No Significant Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Significant Impact.	No change from existing conditions. Conclusion: No Impact.

Table ES-1. Summary of Environmental Consequences

Resource Area	Alternative 1	Alternative 2	No-Action Alternative
	Increase in impacts to nocturnally active animals from increased nighttime	Alternative 2 impacts would be	No change from existing
	HE ordnance delivery. No increase in the potential for bat-aircraft strikes. As	slightly less than presented for	conditions.
	desert tortoises tend to be more active in daylight hours, and spend more	Alternative 1.	Conclusion: No Impact.
	time in burrows during nighttime hours, a positive impact to desert tortoises	Conclusion: No Significant	
	is expected under Alternative 1 due to less daytime ordnance delivery when	Impact.	
Biological	tortoises are more active and susceptible to physiological responses that may	_	
Resources	affect their fitness or survival. Minor behavioral (e.g., moving short		
	distances) and physiological responses (heart rate, alertness) from sonic		
	booms on wildlife would occur. Birds and mammals would habituate to		
	sonic booms with no long-term adverse effects. No anticipated detectable		
	shift in activity for desert tortoises with exposure to repeated sonic booms.		
	Conclusion: No Significant Impact.		
	Air traffic control oversight would continue to be administered by MCAS	Alternative 2 impacts would be the	No change from existing
	Yuma Combined Center and Radar Approach Control to reduce the	same as those presented for	conditions.
Public Health and	likelihood for aircraft mishaps to occur within the CMAGR. Training	Alternative 1.	Conclusion: No Impact.
Safety	operations would continue to abide by the regulations and procedures	Conclusion: No Significant	
	defined by MCAS Yuma Station Order 3710.6J to maximize safety.	Impact.	
	Conclusion: No Significant Impact.		

Acronyms and Abbreviations

A.D. AGL	Anno Domini	MAWTS-1	Marine Aviation Weapons and Tactics
AGL APE	above ground level	MC	Squadron One munitions constituent
APE	area of potential effect	MC MCAS	
D.C	D.C. Cl.:	MCAS	Marine Corps Air Station
B.C.	Before Christ	MCO	Marine Corps Order
BLM	Bureau of Land Management	MSL	mean sea level
BO	Biological Opinion	371.01	
<u> </u>	~ 4.2	NASA	National Aeronautics and Space
CA	California		Administration
CDFW	California Department of Fish and Wildlife	NAVFAC SW	Naval Facilities Engineering
CDNL	C-weighted Day-Night		Command Southwest
	Average Sound Level	Navy	Department of the Navy
CEQ	Council on Environmental Quality	NEPA	National Environmental Policy Act
CFR	Code of Federal Regulations	NHPA	National Historic Preservation Act
CMAGR	Chocolate Mountain Aerial	NPS	National Park Service
	Gunnery Range	NRHP	National Register of Historic Places
CNDDB	California Natural Diversity Database	NVG	Night Vision Goggle
CNEL	Community Noise Equivalent Levels		0 00
	1	OHP	Office of Historic Preservation
dB	decibel		
dBA	A-weighted decibel	psf	per square feet
dBC	C-weighted decibel	r -	F 1
DoD	Department of Defense	REVA	Range Environmental Vulnerability
	- · · · · · · · · · · · · · · · · · · ·		Assessment
EA	Environmental Assessment	ROD	Record of Decision
EIS	Environmental Impact Statement	ROI	Region of Influence
EO	Executive Order	RONA	Record of Non-Applicability
EOD	Explosives Ordnance Disposal	RTA	range and training areas
ESA	Endangered Species Act	KIA	range and training areas
LSA	Endangered Species Act	SHPO	State Historic Preservation Office
FAA	Federal Aviation Administration	SUA	Special Use Airspace
FAA FONSI			
	Finding of No Significant Impact	SWAT	Special Warfare Training Area
ft	feet/foot	II C	II:4-1 C4-4-
HE	1:1 1:	U.S.	United States
HE	high explosive	USC	U.S. Code
DIDAG	1 / 1N / 1D	USFWS	U.S. Fish and Wildlife Service
INRMP	Integrated Natural Resources	USMC	U.S. Marine Corps
	Management Plan	UXO	unexploded ordnance
		WTI	Weapons and Tactics Instructor

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Public Draft

ENVIRONMENTAL ASSESSMENT POST-2200 (10:00 p.m.) HIGH EXPLOSIVE ORDNANCE EXPENDITURE AND SUPERSONIC FLIGHTS CHOCOLATE MOUNTAIN AERIAL GUNNERY RANGE, IMPERIAL AND RIVERSIDE COUNTIES, CALIFORNIA

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1 CHAPTER 1

2

PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

- 3 The United States (U.S.) Marine Corps (USMC) proposes to eliminate schedule restrictions on the delivery
- 4 of high explosive (HE) ordnance at existing targets within the Chocolate Mountain Aerial Gunnery Range
- 5 (CMAGR). The USMC also proposes to authorize supersonic flight in the entire existing R-2507 airspace,
- 6 which overlies the CMAGR. The CMAGR and associated airspace R-2507 are located in southeastern
- 7 California (CA) (Figure 1-1).
- 8 The CMAGR is primarily used for live-fire aviation and ground warfare training conducted by USMC and
- 9 Navy forces. Responsibility for operations and administration of the CMAGR has been delegated by the
- 10 Secretary of the Navy to the Commanding Officer, Marine Corps Air Station (MCAS) Yuma. The CMAGR
- is essential for developing and maintaining the readiness of Marine Corps and Naval aviators and is vital
- for land warfare training conducted by select Navy (i.e., Naval Special Warfare Sea, Air, and Land units)
- and Marine Corps forces.
- 14 The USMC has prepared this Environmental Assessment (EA) in accordance with the National
- 15 Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] §§ 4321-4370h), as implemented by the
- 16 Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] §§ 1500-1508)
- 17 regulations; Department of the Navy (Navy) procedures for implementing NEPA (32 CFR § 775); and
- Marine Corps Order (MCO) P5090.2A, Change 3, dated 26 August 2013, Environmental Compliance and
- 19 Protection Manual, which establishes USMC procedures for implementing NEPA.

1.2 PROJECT LOCATION

- 20 The CMAGR, lying on a southeast-northwest axis, is located in north-central Imperial County and
- south-central Riverside County, CA. The CMAGR is generally bound on the west by the Salton Sea Basin
- and on the east by the Chuckwalla and Palo Verde mountains. The northern border is separated from the
- 23 Orocopia Mountains by Salt Creek and includes part of the Chuckwalla Bench.
- 24 MCAS Yuma manages the R-2507 airspace, which overlays the CMAGR. The R-2507 airspace consists of
- 25 four connected units: R-2507N, R-2507S, R-2507E, and R-2507W (Figure 1-1), MCAS Yuma also supports
- operations, including supersonic operations on the adjacent R-2301, which overlies Barry M. Goldwater
- 27 Range (Figure 1-1).

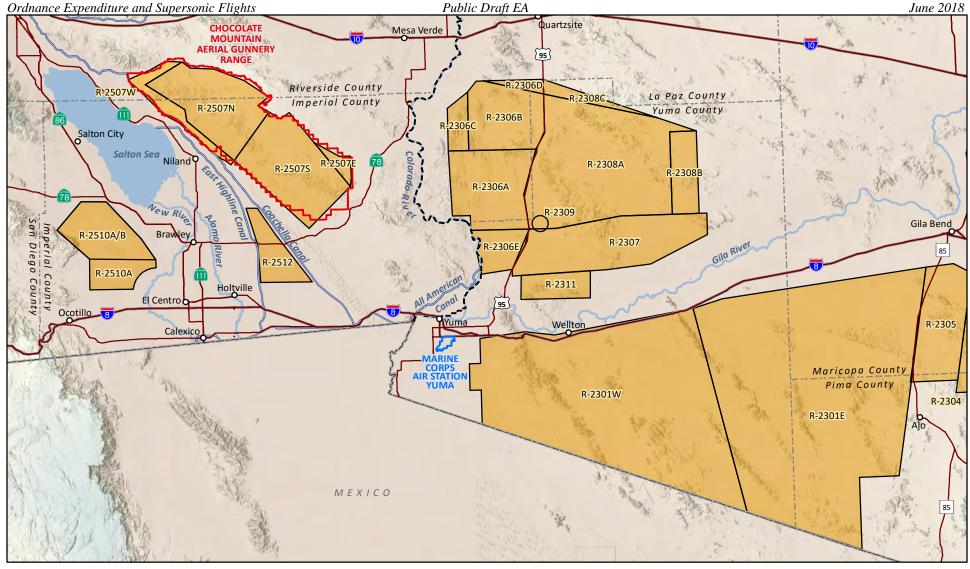
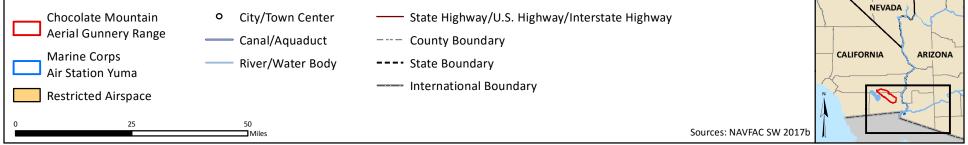


Figure 1-1. Regional Location of the Chocolate Mountain Aerial Gunnery Range and Adjacent Restricted Airspace



1.3 BACKGROUND

1.3.1 Overview

1

- 2 The mission of Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) is to conduct
- 3 standardized, advanced tactical training and certification of unit instructor qualifications that support
- 4 Marine Aviation Training and Readiness via a biannual Weapons and Tactics Instructor (WTI) Course. The
- 5 flight phase of WTI focuses on complex, integrated, full-spectrum scenarios executing day and night
- 6 ordnance delivery against targets within R-2507N and R-2507S (Figure 1-2). Several training evolutions
- 7 require training operations as late as 2330 (11:30 P.M.) but HE ordnance delivery from 2200 (10:00 P.M.)
- 8 through 0600 (6:00 A.M.) is not currently authorized. The constraint on HE ordnance delivery produces
- 9 numerous training and scheduling challenges. In addition, there is a substantial amount of Marine Aviation
- 10 Training and Readiness activities that need to be conducted during late night hours; current scheduling
- constraints hamper the achievement of these activities. During summer months, it can be too light for
- training with night-vision devices until nearly 2100 (9:00 P.M.), leaving very little time to train within the
- current training restrictions. As shown on Figure 1-2, HE ordnance delivery is not allowed in the designated
- "inert ordnance" delivery area generally located in the southwestern portion of the CMAGR.
- 15 Currently, R-2507 does not support supersonic flight. Supersonic flight is currently limited to portions of
- the R-2301W airspace east of MCAS Yuma and overlying the Barry M. Goldwater Range. This current
- 17 "Supersonic Corridor" is a relatively small amount of airspace and does not support all facets of tactical jet
- 18 training or allow ordnance employment within this section of the range.

19 1.3.2 Chocolate Mountain Aerial Gunnery Range

- 20 The CMAGR is the premier ordnance delivery range within Naval Aviation. The CMAGR is a live-fire
- training range that is essential for developing and maintaining the readiness of Marine Corps and Navy
- 22 aviators. The range is also vital for training select Marine Corps and Navy land combat forces. The CMAGR
- was initially established during World War II and has been indispensable for military aviation training ever
- since. The range currently supports training by units of the Navy, U.S. Air Force, U.S. Army, U.S. Reserve
- 25 Components, and U.S. National Guard; however, the Marine Corps is the primary user of the CMAGR.
- 26 Local command for military operation and administration of the CMAGR has been delegated by the
- 27 Secretary of the Navy to the Commanding Officer, MCAS Yuma, Arizona (Navy 2013a).
- 28 Training by units that perform land-based warfighting functions also occurs at the CMAGR. Most of these
- 29 units have missions that are directly associated with tactical aviation including air defense, air surveillance
- and control, forward air control, communications, operation and control of unmanned aircraft systems, and
- forward arming and refueling of rotary-wing and MV-22 aircraft. Marine Corps ground combat activities
- are conducted in the CMAGR in support of aviation training and include artillery and mortar fires and the
- insertion and extraction of ground combat forces (Navy 2013a).
- 34 The semiannual WTI Course, which is conducted by MAWTS-1 stationed at MCAS Yuma, is the premier,
- 35 complex training event that incorporates Marine ground units at the CMAGR. The WTI Course provides
- 36 the Marine Corps' most advanced training for employing aviation weapons and tactics in combat. The
- 37 CMAGR in particular provides the course instructors and students to propose and develop tactics,
- 38 techniques, and procedures for air-to-ground attacks that are appropriate and effective for the types of
- combat challenges that Marine Corps aircrews face in the contemporary world (Navy 2013a).

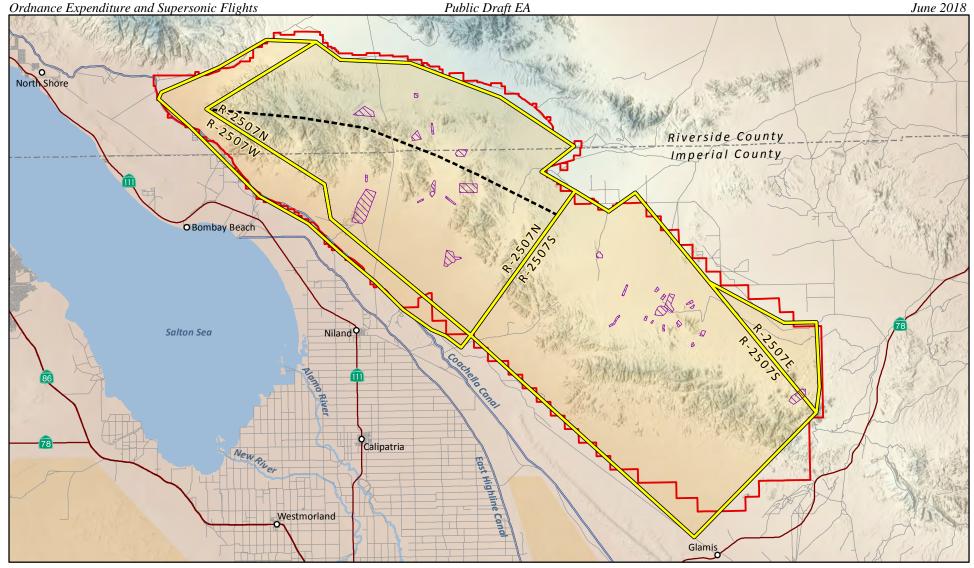
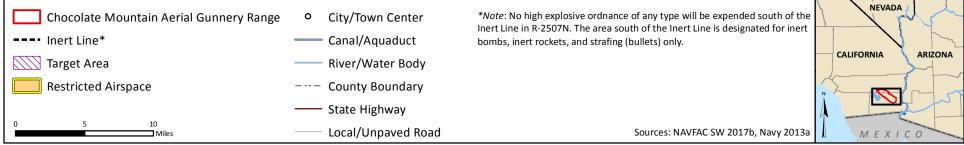


Figure 1-2. Target Locations within the Chocolate Mountain Aerial Gunnery Range



1 2

8 9

1.3.3 High Explosives Ordnance Training at the Chocolate Mountain Aerial Gunnery Range

- 3 Ordnance employed at the CMAGR includes HE ordnance, which refers to ordnance that explodes, as
- 4 opposed to burning or inert (non-explosive) ordnance. Table 1-1 presents the type of HE ordnance that is
- 5 currently authorized for use at the CMAGR, and the average annual usage of each type from 2014-2016.
- 6 Fixed-wing, rotary-wing, and tilt-rotor aircraft (including but not limited to the F-35B [Joint Strike Fighter],
- 7 F/A-18C/D, AV-8B, AH-1W, MV-22) currently conduct HE ordnance training in the CMAGR.

Table 1-1. Summary of Types of High Explosive Ordnance Used

Ordnance Type	Description	Average Annual Usage
2.75-inch Rocket HE	Unguided 2.75-inch air-to-ground rocket with a solid propellant motor and a HE warhead.	9,595
5-inch Rocket HE	Unguided 5-inch air-to-ground rocket with solid propellant motor and a HE warhead.	
CBU	Cluster Bomb Units (CBUs) including CBU-87, -99, -100, and -103. These canisters contain multiple small HE submunitions.	44
MK-81 HE	HE version of the 250-pound general purpose bomb, which is a free-fall, unguided bomb. These bomb bodies can also be used with various guidance kits.	1
MK-82 HE	HE version of the 500-pound general purpose bomb, which is a free-fall, unguided bomb. These bomb bodies can also be used with various guidance kits.	1,588
MK-83 HE	HE version of the MK-83, 1,000-pound general purpose bomb, which is a free-fall, unguided bomb. These bomb bodies can also be used with various guidance kits.	
MK-84 HE	HE version of the MK-84, 2,000-pound general purpose bomb, which is a free-fall, unguided bomb. These bomb bodies can also be used with various guidance kits.	11
AGM	Air-to-Ground Missiles (AGMs), including the AGM-65 Maverick and AGM-114 Hellfire.	84
Various guns	Aviation platforms with single-barrel or multi-barrel gun systems in calibers: 7.62 millimeter (mm), .50 caliber, 20mm, 25mm, 30mm, 105mm.	154,373

1.3.4 Marine Aviation Weapons and Tactics Training at the Chocolate Mountain Aerial Gunnery Range

The mission of MAWTS-1 is to conduct standardized, advanced tactical training and certification of unit

- instructor qualifications that support Marine Aviation Training and Readiness. MAWTS-1 accomplishes this by conducting a biannual (twice a year in the spring and fall) WTI Course. WTI is the Marine Corps'
- premier aviation weapons and tactics course and its evolutions are designed to provide the most realistic
- training environment possible. The WTI Course is a 7-week course consisting of advanced tactical aviation
- training designed to produce weapons and tactics instructors.
- 16 The purpose of the WTI Course is to hone the skills of Marine Corps pilots in weapons delivery, tactics,
- 17 command and control, and integration of joint forces. Using classroom-based and flight-based instructions,
- the WTI Course qualifies instructors to lead the training and education of aviation units. The last week of
- the flight phase is highlighted by a final exercise during which students plan and carry out a fully integrated,
- 20 combined arms operation. The exercise is the culmination of a curriculum focused on the six major
- 21 functions of Marine Aviation: offensive air support, anti-air warfare, assault support, aerial reconnaissance,

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6 7 electronic warfare, and control of aircraft and missiles. The course qualifies students in key training officer billets to act as a training expert in the fleet, ensuring that Marine Aviation units continue to train effectively and to a consistent standard across the Marine Corps. The flight phase of WTI focuses on complex, integrated, full-spectrum scenarios executing day and night ordnance delivery against targets within the R-2507N/S. Where authorized, HE ordnance is the standard because its training value cannot be replicated with inert ordnance or simulation. Table 1-2 summarizes the average annual usage of HE at the CMAGR during WTI by type from 2014-2016.

Table 1-2. Average Annual Use of High Explosive Ordnance (WTI Only)

Ordnance Type	Description	Average Annual Usage
2.75-inch Rocket HE	Unguided 2.75-inch air-to-ground rocket with a solid propellant motor and a HE warhead.	2,595
5-inch Rocket HE	Unguided 5-inch air-to-ground rocket with solid propellant motor and a HE warhead.	50
CBU	Cluster Bomb Units including CBU-87, -99, -100, and -103. These canisters contain multiple small HE submunitions.	3
MK-81 HE	HE version of the 250-pound general purpose bomb, which is a free-fall, unguided bomb. These bomb bodies can also be used with various guidance kits.	0
MK-82 HE	HE version of the 500-pound general purpose bomb, which is a free-fall, unguided bomb. These bomb bodies can also be used with various guidance kits.	435
MK-83 HE	HE version of the MK-83, 1,000-pound general purpose bomb, which is a free-fall, unguided bomb. These bomb bodies can also be used with various guidance kits.	260
MK-84 HE	HE version of the MK-84, 2,000-pound general purpose bomb, which is a free-fall, unguided bomb. These bomb bodies can also be used with various guidance kits.	3
AGM	Air-to-Ground Missiles, including the AGM-65 Maverick and AGM-114 Hellfire.	43
Various guns	Aviation platforms with single-barrel or multi-barrel gun systems in calibers: 7.62mm, .50 caliber, 20mm, 25mm, 30mm, 105mm.	66,679

- 8 Implementation of the Proposed Action would support the achievement of training requirements, notably
- 9 the MAWTS-1 advanced tactical training and certification of unit instructor qualifications that support
- 10 Marine Aviation Training and Readiness.

11 1.3.5 The F-35B Program at MCAS Yuma

- 12 The F-35B aircraft represents the future of Marine Corps tactical aviation and incorporates the mission
- capabilities of the Marine Corps platforms it is replacing: the AV-8B Harrier, F/A-18 Hornet, and EA-6B
- Prowler-within a single airframe. In addition to its short takeoff and vertical landing capability, the F-35B's
- unique combination of stealth, radar, sensor technology, and electronic warfare systems bring all of the
- access and warfighting capabilities of a fifth-generation fighter, a modern bomber, and an adverse-weather,
- all-threat environment air support platform (see USMC F-35B West Coast Basing EIS USMC 2010).
- 18 To conduct the broad array of training necessary for combat readiness, F-35B pilots must have access to
- 19 adequate training ranges and airspace. Ranges comprise land areas supporting targets, simulated threats,
- 20 communications, scoring systems, and other facilities. The F-35B's capabilities and associated tactics

- dictate that the aircraft operate primarily at higher altitudes, commonly above 5,000 feet (ft) above ground level (AGL).
- 3 Although the F-35Bs perform the missions of the legacy F/A-18 and AV-8B aircraft, they represent a
- 4 different aircraft with different capabilities, and fly somewhat differently. The following highlights some
- 5 of the operational parameters of the F-35B:

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- Use of Higher Altitudes. The F-35B conducts training at higher altitudes than the legacy aircraft, operating above 5,000 ft AGL more than 99 percent of the time.
- Combined Use of Existing Airspace. The F-35B conducts training missions requiring the combination of existing airspace units rather than single units.
- Ordnance Delivery Training. The F-35B trains with live (30 percent) and inert (70 percent) bombs only at ranges and targets authorized for the particular events and weapons.
- Defensive Countermeasure Flares. F-35B pilots employ defensive countermeasure flares during some training flights to practice avoiding threats. Flare use occurs only in authorized airspace and follow all range regulations to ensure complete and safe combustion of the flare.
- Supersonic Flight. To train with the full capabilities of the aircraft, the F-35B performs supersonic flights typically above 25,000 ft above mean sea level (MSL) and generally last no longer than approximately 2 minutes.

Currently, aviation activities at R-2507 include both live-fire and non-live-fire aviation training activities such as basic ordnance firing, air combat maneuvering, close air support, air-to-air gunnery, laser ranging and designating, air strikes, and unmanned aircraft system operations. A typical strike mission normally includes attacking different target sets within the CMAGR airspace as well as a simulated enemy scheme of maneuver to avoid or defeat enroute to, or within, the target area. Table 1-3 describes the primary training activities for the F-35B. Integrated training performed by the F-35B would utilize these types of activities as individual aircraft, in small groups (e.g., two versus four), and in larger exercises (USMC 2010).

Table 1-3. Typical Training Activities for the F-35B in the CMAGR

Activity	Task
Air-to-Ground	Usually 2 or 4 aircraft, low to high altitude tactical weapons delivery and escape maneuvers (day and night).
Air-to-Air	Multi-aircraft formations and tactics, system check, G-force awareness, 2 versus 4 and 4 versus 6 aircraft intercepts, combat air patrol, defense of airspace sector for composite force attack, intercept and destroy bomber aircraft, avoid adversary fighters.
Close Air Support	Close Air Support is air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to allied forces and that require detailed integration of each air mission with the fire and movement of those forces.
Low Altitude Training	1 or 2 aircraft offensive and defensive operations at low altitude, G-force awareness at low altitude, handling, turns tactical formations, navigation, threat awareness, defensive response, defensive countermeasure (flares) use, low to high and high to low altitude intercepts, missile defense, combat air patrol against low/medium altitude adversaries.
Tactical Intercepts	2 versus 4 and 4 versus 6 tactical intercepts, G-force awareness, electronic countermeasures, lead and formation flying.

Table 1-3. Typical Training Activities for the F-35B in the CMAGR

Activity	Task	
Dissimilar Air Combat Tactics	Multi-aircraft and multi-adversary (involving dozens of aircraft) defense and combat air patrol, defense of airspace sector from composite force attack, intercept and destroy bomber aircraft, avoid adversary fighters, strike-force rendezvous and protection.	
Mission Employment	Multi-aircraft and multi-adversary (involving dozens of aircraft) composite strike force exercise (day and night), systems check, air refueling, strike force defense and escort, air intercepts, electronic countermeasures, combat air patrol, defense against composite force, bomber intercepts, defensive countermeasure (flare) use.	
Ordnance Delivery	Single to multiple aircraft attacking a wide range of ground targets using different ingress and egress methods, delivery tactics, ordnance types, angles of attack, and combat scenarios.	

1.3.6 Prior Analysis

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- HE ordnance delivery in the CMAGR from 2200 0600 (10:00 P.M. 6:00 A.M.) is not currently authorized. 2
- 3 According to Federal Register documentation of the 1998 Department of Defense (DoD) Record of
- 4 Decision (ROD) for the Yuma Range Complex, there was a proposal (Alternative 10-2) to rescind the
- ordnance restriction at that time. However, the decision regarding Alternative 10-2 was "no action." The 5
- proposal clarified, however, that a further reason not to carry overnight ordnance delivery was because no 6
- 7 specific proposal existed to drop ordnance during those hours. The ROD concluded that environmental
- documentation would be prepared pursuant to NEPA, as appropriate, when a proposal is ripe for 8
 - consideration (63 Federal Register 53026, 53029). As described in this EA, the USMC training needs are
- such that the proposal is now ripe for consideration. 10

11 1.3.7 **On-Going Training Challenges**

- 12 Sunset during WTI Courses occurs as late as 1915 (7:15 P.M.) with Night Vision Goggle (NVG)
- 13 illumination levels (End of Evening Nautical Twilight) occurring later at 2015 (8:15 P.M.). During the
- 14 summertime, NVG illumination levels do not occur until after approximately 2100 (9:00 P.M.). This leaves
- 15 less than two hours of NVG conditions for HE ordnance delivery during WTI Courses, and less than one
- 16 hour for summertime training activities. The vast majority of WTI ordnance operations occur in either the
- 17 CMAGR or the R-2301E/W. Inert ordnance is the default in the R-2301E/W since HE is prohibited. There
- is greater training value to using live ordnance, as it better simulates real-world conditions. In addition, 18
- most MAWTS-1 divisions and external squadrons have more HE than inert ordnance in their allocation. 19
- 20 The limited availability of inert ordnance requires operations planners to ration their allocation, resulting in
- unrealistic loadouts and reduced training value for both air and ground participants. In the second WTI class 21
- 22 of 2014, WTI had more than 45 sorties, including two final exercises, negatively impacted by the post-2200
- 23 hour (10:00 P.M.) HE scheduling restriction.
- 24 Naval Aviation, along with numerous aircraft within the DoD community, requires the ability to conduct
- 25 training at supersonic speeds, primarily to facilitate the full exploitation of aircraft sensor suites. This
- 26 training is a key component of tactical mission replication sought in a training environment. This training
- 27 includes air-to-air combat simulation as well as certain portions of air-to-ground mission profiles. When
- the F-35B program at Yuma was analyzed in 2010, the supersonic usage analysis focused on the use of 28
- 29 restricted airspace R-2301E/W. R-2301W is currently used for supersonic flight by the legacy F/A-18 and
- other fighter aircraft (including U.S. Air Force aircraft), as well as F-35B (USMC 2010). USMC has since 30

- realized that the R-2301W airspace is too restrictive to realize the full capabilities and training needs of the
- 2 F-35B. Thus, this training is limited in space by the restrictions within the R-2301W and lack of a supersonic
- area within the CMAGR, as well as in times where air-to-ground ordnance delivery may be subject to the
- 4 current scheduling restrictions. Furthermore, the F-35B is capable of supersonic speeds while burdened
- 5 with ordnance; neither of the legacy aircraft used in WTI Courses have this capability. Thus, to ensure that
- 6 WTI Courses allow participants to have full use of the equipment available, supersonic support within all
- of R-2507 is required for legacy and new (e.g., F-35B, etc.) aircraft.

1.4 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

- 8 The purpose of the Proposed Action is to support the achievement of standardized, advanced tactical
- 9 training and certification of unit instructor qualifications that support Marine Aviation Training and
- 10 Readiness. The Proposed Action is needed because as currently restricted, HE ordnance training
- 11 requirements cannot be satisfied, which adversely impacts training ability and overall operational readiness.
- 12 The second purpose of the Proposed Action is to provide aviators the ability to train to the full capability
- of the aircraft, and to the tactics, techniques, and procedures that are part of Marine Aviation Training and
- Readiness. The supersonic flight area is needed to facilitate the full exploitation of aircraft sensor suites.

1.5 SCOPE OF ANALYSIS

- 15 This EA describes the potential environmental consequences resulting from two action alternatives
- 16 (Alternatives 1 and 2) and the No-Action Alternative on the following resource areas: airspace and air
- traffic, noise, cultural resources, biological resources, and public health and safety (including environmental
- 18 justice). As discussed in Chapter 3, impacts to other resource areas are anticipated to be negligible or
- 19 non-existent from implementation of the alternatives, and as such have not been analyzed in detail.

1.6 REGULATORY SETTING

- 20 This EA has been prepared based on NEPA requirements as outlined in the following statutes, regulations,
- and guidance documents:

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- NEPA of 1969 (42 USC §§ 4321-4370h), which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment;
- CEQ regulations (40 CFR §§ 1500-1508), which implement the requirements of NEPA;
- Navy regulations for implementing NEPA (32 CFR § 775), which provide Navy policy for
 implementing the CEQ regulations and NEPA; and
 - MCO P5090.2A, Change 3, dated August 26, 2013, Environmental Compliance and Protection Manual, which establishes USMC procedures for implementing NEPA.
- This EA has been prepared in accordance with the following additional statutory and executive requirements:
- Clean Air Act, as amended (42 USC §§ 7401-7671q), including 1990 General Conformity Rule;
- Clean Water Act (33 USC §§ 1251-1387);
- Comprehensive Environmental Response, Compensation, and Liability Act (42 USC §§ 9601-9675);
 - Endangered Species Act (16 USC §§ 1531-1544);

- Executive Order (EO) 12898 Federal Actions to Address Environmental Justice in Minority
 Populations and Low-income Populations;
- EO 13045 Protection of Children from Environmental Health Risks and Safety Risks;
 - EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds;
 - EO 13693 Planning for Federal Sustainability in the Next Decade;
 - Migratory Bird Treaty Act (16 USC §§ 703-712);
- National Historic Preservation Act (54 USC §§ 300101-305306);
 - American Indian Religious Freedom Act (42 USC §§ 1996 and 1996a); and
- Resource Conservation and Recovery Act (42 USC §§ 6901-6992k) and governing regulations (40 CFR §§ 260-282).

1.7 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

- 11 Chapter 1 of this EA describes the background, purpose of, and need for the Proposed Action. Chapter 2 of
- 12 this EA describes the alternatives. Chapter 3 provides a description of the affected environment and the
- potential direct and indirect impacts of each alternative on each environmental resource area. Chapter 4
- 14 presents the potential cumulative impacts of the Proposed Action in conjunction with the identified past,
- present, and reasonably foreseeable projects.
- 16 Chapter 5 provides other analyses required by NEPA (i.e., possible conflicts between the action and the
- objectives of federal, regional, state and local plans, policies, and controls; irreversible and irretrievable
- commitment of resources). Chapter 6 contains all references used in this EA. Chapter 7 provides the list of
- 19 EA preparers and their qualifications. The appendices contain additional information and documentation
- 20 prepared in support of this EA.

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1.8 PUBLIC PARTICIPATION

- 21 As part of this EA, the USMC will publish a Public Notice of Availability for the Public Draft EA in two
- 22 local newspapers: the *Imperial Valley Press* and the *Adelante Valle*. The Public Draft EA will be made
- 23 available at the following three libraries for public review and comment: the Holtville City Library, the El
- 24 Centro Public Library, and the Brawley Public Library. In addition, the Public Draft EA will be posted to
- the MCAS Yuma website. The public will have a 30-day period to provide their comments.

1 CHAPTER 2

DESCRIPTION OF THE PROPOSED ACTION AND

3 ALTERNATIVES

2.1 OVERVIEW

- 4 Under the Proposed Action, the USMC proposes to eliminate schedule restrictions on the delivery of HE
- 5 ordnance at existing targets within the CMAGR. The USMC also proposes to authorize supersonic flight
- 6 in the existing airspace overlying the CMAGR. The USMC does not propose to increase the quantity or
- 7 magnitude of HE ordnance usage; nor does USMC propose any change in the existing target configuration
- 8 or facilities, or airspace.
- 9 Under the Proposed Action, HE ordnance could be employed 24-hours a day. Also under the Proposed
- 10 Action, USMC proposes to use R-2507 for supersonic flight. The airspace currently under analysis for
- supersonic use is from the ground surface to 40,000 ft above MSL, 360 degrees, 24 hours/365 days a year.
- 12 The use of R-2507 for supersonic flight does not include any change in total flight operations or supersonic
- use in any other airspace currently managed by MCAS Yuma.
- 14 As this Proposed Action would support on-going training activities within the CMAGR, the project team
- did not consider any locational alternatives other than the CMAGR. Two action alternatives meet the
- purpose of and need for the Proposed Action. They are described in Sections 2.2, *Alternative 1* and 2.3,
- 17 Alternative 2. As required by 40 CFR § 1502.14, this EA also analyzes the No-Action Alternative.

2.2 ALTERNATIVE 1

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2.2.1 High Explosive Ordnance Usage

- 19 Under Alternative 1, the current overnight scheduling restrictions for the delivery of HE ordnance at the
- 20 CMAGR would be eliminated. As a result, air-to-ground HE ordnance delivery to existing targets within
- the CMAGR could occur at any time of the day or night, 365 days per year. However, the majority of
- 22 nighttime HE ordnance expenditures would occur in the hour between 2200 and 2300 (10:00 and 11:00
- 23 P.M.) during WTI Courses, though occasionally early morning 2400 0600 (12:00 6:00 A.M.) activity
- would occur. This is because area airfields close at 2330 (11:30 P.M.) (notwithstanding occasional
- exemptions); thus, it would be a rare occurrence to have post-2330 (11:30 P.M.) HE ordnance expenditures,
- as aircraft would be grounded at that time.
- 27 Alternative 1 does not propose any increase in the quantity, magnitude, target location, or type of ordnance
- employed at the CMAGR; the USMC only proposes to change the available scheduling of ordnance
- 29 employment. The Proposed Action would not establish any new training ranges or target areas or result in
- additional ground disturbance from current conditions.

2.2.2 Airspace Activities

- 32 Under Alternative 1, supersonic flight could potentially occur within R-2507 at any altitude up to 40,000 ft
- MSL, 24 hours per day, 365 days per year by legacy and new (e.g., F-35B, etc.) aircraft. In execution,
- however, and as supported by noise modeling results (Naval Facilities Engineering Command Southwest
- 35 [NAVFAC SW] 2018), supersonic flights would occur at various altitudes and various headings/directions

- I within the airspace. Supersonic flights would be oriented primarily around a major axis aligned with the
- 2 long axis of the airspace dimension and multiple shorter minor axis perpendicular to the major axis. As
- 3 shown in Figure 2-1, the major axis would run from the southeast to the northwest. While supersonic
- 4 operations could occur at all elevations within the airspace, for the most part they would occur over 25,000
- ft above MSL and generally last no longer than approximately 2 minutes (though the boom[s] would be
- 6 heard as an instantaneous noise event, similar to a thunder clap).

2.3 ALTERNATIVE 2

- 7 Alternative 2 consists of the same authorized use of HE ordnance at existing targets within the CMAGR.
- 8 However, recognizing that the primary driver to eliminate scheduling restrictions is WTI Course training
- 9 and operations, USMC proposes a narrower action alternative in which the scheduling restrictions are only
- 10 lifted during WTI Courses. This course typically occurs twice annually and runs for 7 weeks. During the
- course, current scheduling restrictions would be lifted to allow for maximum overnight training flexibility.
- 12 After the WTI Course is completed, the scheduling restrictions would resume. Under Alternative 2, the
- same supersonic flights would occur as described under Alternative 1.

2.4 No-Action Alternative

- 14 For the purposes of this EA, "no action" means that the current scheduling restrictions for HE ordnance use
- at the CMAGR would remain in place. Consequently, the potential training challenges for the WTI and
- similar operations at the CMAGR would persist. Similarly, supersonic flight would not be authorized within
- 17 R-2507. This situation would continue to affect the capability of forces to achieve training requirements.
- 18 The No-Action Alternative is included as a baseline for comparison to all action alternatives for determining
- 19 project effects.
- The No-Action Alternative is not considered a reasonable alternative because it does not meet the purpose
- of and need for the Proposed Action. However, as required under CEQ regulations (40 CFR § 1502.14[d]),
- the No-Action Alternative does provide a description of the baseline conditions against which the impacts
- of the Proposed Action can be compared.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

- 24 For WTI operations in the CMAGR, USMC has considered increased usage of inert ordnance, which does
- 25 not face the same scheduling constraints, as does HE ordnance. The exclusive use of inert ordnance is not
- 26 feasible, however, due to supply limitations. More importantly, the use of inert ordnance would also not
- 27 satisfy the need of the Proposed Action, as exclusive use of inert ordnance does not allow "real world"
- simulations in the training environment which includes ordnance build-up, transportation, and loading in
- addition to the expenditure. Thus, ordnance training requirements cannot be satisfied, which adversely
- 30 impacts training ability and overall operational readiness.
- USMC also considered using HE ordnance as currently permitted, and then changing to inert ordnance for
- 32 late night/early morning exercises only. This modification would not be feasible. The MCAS Yuma Airfield
- operates until 2230 (11:30 P.M.), which would not provide sufficient nighttime hours for aircraft to offload
- 34 HE ordnance, upload inert ordnance, and return to the field with enough time to meaningfully support NVG
- training operations. Therefore, this modification would similarly not support the purpose and need of the
- 36 Proposed Action. As neither full inert ordnance usage nor partial inert ordnance options can address the
- 37 needs for training and operational readiness, this alternative was not brought forward for detailed analysis.

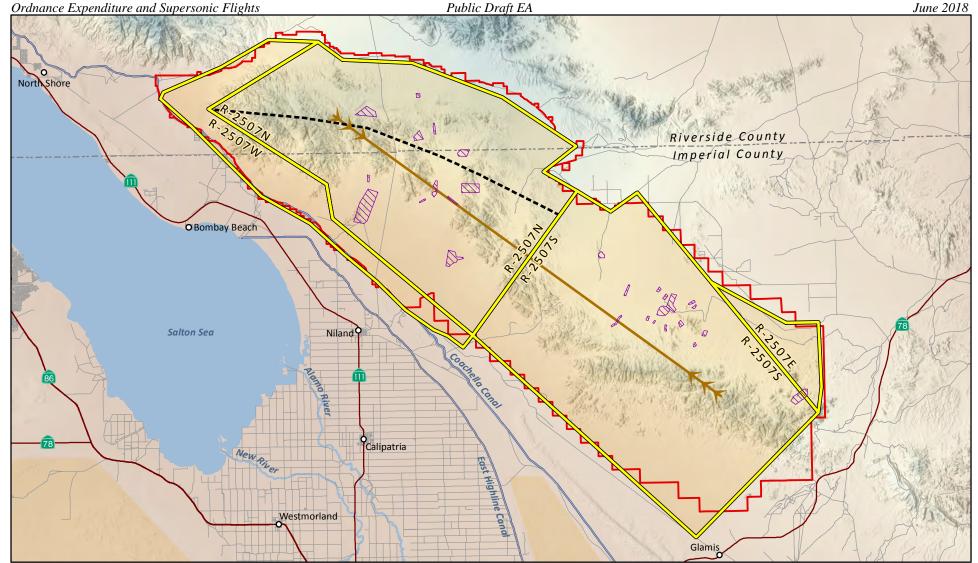
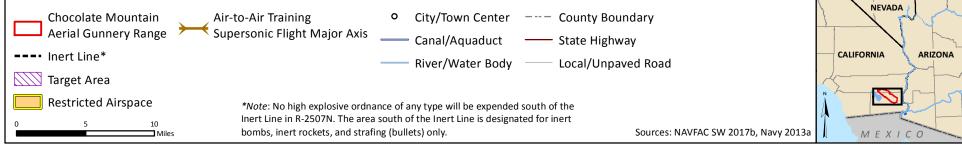


Figure 2-1. Proposed High Explosive Ordnance Expenditures and Supersonic Flight Axis



2.6 Preferred Alternative

- 1 The USMC has identified Alternative 1 as the Preferred Alternative for implementation of the Proposed
- 2 Action.

2.7 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

- 3 In accordance with NEPA, the USMC performed a focused analysis of the following resource areas
- 4 potentially affected by implementation of the Proposed Action: airspace and air traffic, noise, cultural
- 5 resources, biological resources, and public health and safety. Potential impacts to other resource areas,
- 6 which are primarily ground-based, are anticipated to be negligible or non-existent from implementation of
- 7 the alternatives. Table 2-1 presents a summary of the potential impacts to each resource area from
- 8 implementation of the alternatives.

Table 2-1. Summary of Environmental Consequences

Resource Area	Alternative 1	Alternative 2	No-Action Alternative		
Resource Areas Eliminated from Detailed Analysis					
Air Quality	A temporal shift in existing emissions; no new combustion-related emissions or fugitive dust emissions would occur. Supersonic flights would not result in any increase in aircraft afterburner use. Therefore, there would be no increase in criteria pollutant or greenhouse gas emissions. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.		
Geological Resources	A temporal shift to existing geological resource impacts from HE ordnance delivery; no new impacts would occur. Supersonic flights would not affect geological resources because the activity would be entirely airspace-based. <i>Conclusion</i> : No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.		
Water Resources	A temporal shift to existing water resource impacts from HE ordnance delivery; no new impacts would occur. Supersonic flights would not affect water resources because the activity would be entirely airspace-based. <i>Conclusion</i> : No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.		
Hazardous Materials and Wastes	A temporal shift to the existing use/generation of hazardous materials and wastes; no new impacts would occur. All hazardous materials would continue to be managed and handled in accordance with applicable MCAS Yuma Environmental Standard Operating Procedures. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.		
Land Use	No change to existing land use designations. No increase in noise levels that would be incompatible with existing land uses. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.		
Recreation	No impact to the public's ability to recreate in existing recreational areas adjacent to the CMAGR. No increase in noise levels that would be incompatible with existing recreational uses. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.		
Socioeconomics and Environmental Justice	No creation of new jobs or alteration of regional economic conditions. Conclusion: No Impact. No children are located within the CMAGR and public access is restricted. Noise levels would not exceed established thresholds at off-installation areas. Conclusion: No Disproportionate Impact to minority populations or the health and safety of children.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact; No Disproportionate Impact to minority populations or the health and safety of children.	No change from existing conditions. Conclusion: No Impact.		

Table 2-1. Summary of Environmental Consequences

Resource Area	Alternative 1	Alternative 2	No-Action Alternative			
Ground Transportation	No generation of additional vehicle trips or impact to the existing regional transportation network. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.			
Utilities	No increase in utility demand or impact to existing regional utility infrastructure. Conclusion: No Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Impact.	No change from existing conditions. Conclusion: No Impact.			
Visual Resources	No alteration of the existing visual setting of the project area and vicinity. Topography would visually screen off-installation areas from post-2200 (10:00 P.M.) HE ordnance expenditures. Supersonic flights would be visually consistent with existing aircraft activity. <i>Conclusion:</i> Negligible Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: Negligible Impact.	No change from existing conditions. Conclusion: No Impact.			
Resource Areas An	Resource Areas Analyzed in Detail					
Airspace and Air Traffic	No alteration of the existing configuration of the R-2507 airspace. No increase in number of sorties or in the type or amount of HE ordnance delivered at designated target areas at the CMAGR. No impact to regional air traffic. Supersonic flight operations would generally last no longer than approximately 2 minutes at an altitude above 25,000 feet. Conclusion: No Significant Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Significant Impact.	No change from existing conditions. Conclusion: No Impact.			
Noise	Incremental increase in nighttime aircraft noise and ordnance delivery (explosions), and introduction of sonic booms. The combined effect of new noise would generate noise levels far below the threshold for community noise impacts within their respective noise metrics – while still within the range boundaries. Given that noise attenuates over distance, noise levels outside the CMAGR would be even lower. Conclusion: No Significant Impact.	Alternative 2 impacts would be slightly less than presented for Alternative 1. Conclusion: No Significant Impact.	No change from existing conditions. Conclusion: No Impact.			
Cultural Resources	Current air-to-ground and air-to-air training within the project area avoids impacting known cultural resource sites; no new impacts would occur. Overpressures from sonic booms would not damage historic properties. Conclusion: No Significant Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Significant Impact.	No change from existing conditions. Conclusion: No Impact.			

Table 2-1. Summary of Environmental Consequences

Resource Area	Alternative 1	Alternative 2	No-Action Alternative
Biological Resources	Increase in impacts to nocturnally active animals from increased nighttime HE ordnance delivery. No increase in the potential for bat-aircraft strikes. As desert tortoises tend to be more active in daylight hours, and spend more time in burrows during nighttime hours, a positive impact to desert tortoises is expected under Alternative 1 due to less daytime ordnance delivery when tortoises are more active and susceptible to physiological responses that may affect their fitness or survival. Minor behavioral (e.g., moving short distances) and physiological responses (heart rate, alertness) from sonic booms on wildlife would occur. Birds and mammals would habituate to sonic booms with no long-term adverse effects. No anticipated detectable shift in activity for desert tortoises with exposure to repeated sonic booms. <i>Conclusion:</i> No Significant Impact.	Alternative 2 impacts would be slightly less than presented for Alternative 1. Conclusion: No Significant Impact.	No change from existing conditions. Conclusion: No Impact.
Public Health and Safety	Air traffic control oversight would continue to be administered by MCAS Yuma Combined Center and Radar Approach Control to reduce the likelihood for aircraft mishaps to occur within the CMAGR. Training operations would continue to abide by the regulations and procedures defined by MCAS Yuma Station Order 3710.6J to maximize safety. <i>Conclusion:</i> No Significant Impact.	Alternative 2 impacts would be the same as those presented for Alternative 1. Conclusion: No Significant Impact.	No change from existing conditions. Conclusion: No Impact.

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1 CHAPTER 3

2 AFFECTED ENVIRONMENT AND ENVIRONMENTAL

3 CONSEQUENCES

3.1 APPROACH TO ANALYSIS _____

- 4 NEPA, CEQ regulations, and Navy and USMC procedures for implementing NEPA specify that an EA
- 5 should only focus on those environmental resource areas potentially subject to impacts. In addition, the
- 6 level of analysis should be commensurate with the anticipated level of impact. A NEPA document should
- 7 consider, but not analyze in detail, those areas or resources not potentially affected by a Proposed Action.
- 8 Therefore, a NEPA document should not be encyclopedic; rather, it should be succinct and to the point.
- 9 Both the description and analysis in an EA should provide sufficient detail and depth to ensure that the lead
- agency (e.g., USMC) took a critical look at all resources potentially impacted by an action. NEPA also
- 11 requires a comparative analysis that allows decision-makers and the public to differentiate among the
- alternatives. Thus, this EA focuses on those resources potentially subject to impacts resulting from the
- 13 Proposed Action.
- 14 This chapter presents the affected environment and potential environmental consequences for the following
- resource areas: airspace and air traffic, noise, cultural resources, biological resources, and public health and
- safety. Conversely, this EA does not include a detailed analysis of the resource areas discussed in Section
- 3.1.1, Resources Eliminated from Detailed Analysis below, as the USMC anticipates that negligible or no
- impacts to these resources areas would occur from implementation of the alternatives.

19 3.1.1 Resources Eliminated From Detailed Analysis

- 20 3.1.1.1 Air Quality
- The Proposed Action would not change the number or type of aircraft sorties that currently occur in the
- 22 R-2507 airspace. The introduction of supersonic flights is not expected to result in an increase in aircraft
- afterburner use. Therefore, the Proposed Action's flight operations would have no effect on criteria
- 24 pollutant or greenhouse gas emissions within the CMAGR, the Salton Sea Air Basin, or in Imperial and
- 25 Riverside counties, as there would be no change to existing training that would result in an impact to air
- 26 quality. The Proposed Action would continue to generate fugitive dust during training activities; however,
- 27 the fugitive dust would be temporary and localized to the CMAGR, away from population centers, and
- 28 consistent with existing training activities. Moreover, no increase in fugitive dust emissions would occur.
- 29 Accordingly, the Proposed Action is consistent with the emissions calculations and Record of
- 30 Non-Applicability (RONA) for Clean Air Act Conformity contained in the F-35B West Coast Basing
- 31 Environmental Impact Statement (EIS) (USMC 2010). Appendix A contains the RONA and relevant
- 32 emissions calculations from the 2010 EIS. Therefore, implementation of any one of the alternatives would
- result in no impact to air quality.
- 34 3.1.1.2 Geological Resources
- 35 The Proposed Action would not result in an increase in soil disturbance because HE ordnance use would
- 36 continue at existing targets with no increase in ordnance expenditures. The change in HE use would strictly
- be a schedule change; there would be no new impacts to geology and soils. The proposed addition of
- supersonic flight is entirely airspace-based, with no changes to ground-based training activities. Thus,

- 1 existing geological resources would not be impacted. Therefore, implementation of any one of the
- 2 alternatives would result in no impact to geological resources.
- 3 3.1.1.3 Water Resources
- 4 The Proposed Action would not result in an increase in impacts to water resources because HE ordnance
- 5 use would continue at existing targets with no increase in ordnance expenditures. The change in HE use
- 6 would strictly be a schedule change; there would be no new impacts to water resources. The proposed
- 7 addition of supersonic flight is entirely airspace-based, with no changes to ground-based training activities.
- 8 Thus, existing water resources would not be impacted. Therefore, implementation of any one of the
- 9 alternatives would result in no impact to water resources.
- 10 3.1.1.4 Hazardous Materials and Waste
- 11 MCAS Yuma's Range Environmental Vulnerability Assessment (REVA) program is a proactive and
- comprehensive program designed to support the Marine Corps' Range Sustainment Program. Operational
- ranges across the Marine Corps are being assessed to identify areas and activities that are subject to possible
- 14 impacts from external influences, as well as to determine whether a release or substantial threat of a release
- of munitions constituents (MC) from operational ranges to off-range areas creates an unacceptable risk to
- human health and/or the environment. This is accomplished through periodic assessments of operational
- 17 range areas and, where applicable, the use of fate and transport modeling and analysis of the REVA
- indicator MC based on site-specific environmental conditions at the operational ranges and training areas.
- As detailed in the 2015 REVA, surface water, sediment, and groundwater assessments, including field
- sampling, did not indicate off-installation releases of MC from operational ranges at MCAS Yuma (MCAS
- 21 Yuma 2015).
- 22 The Proposed Action would not result in an increase in potential impacts to or from hazardous materials or
- 23 waste because HE ordnance use would continue at existing targets with no increase in ordnance
- expenditures. The change in HE use would strictly be a schedule change; there would be no new impacts
- 25 to or from hazardous materials or waste. The proposed addition of supersonic flight is entirely
- airspace-based, with no changes to ground-based training activities. There would be no increase in MC. All
- 27 hazardous materials utilized and wastes generated would continue to be managed and handled in accordance
- with applicable MCAS Yuma Environmental Standard Operating Procedures. Therefore, implementation
- 29 of any one of the alternatives would result in no impact to hazardous materials and wastes.
- *30* 3.1.1.5 Land Use
- 31 The Proposed Action would occur above lands owned by the federal government designated for military
- training. The Proposed Action would not change this designation and would be consistent with the CMAGR
- Proposed Land Withdrawal Renewal Legislative EIS (Navy 2013a). Surrounding land uses, which include
- open space, natural resource exploration, recreation, utility corridors, and transportation corridors, would
- not be altered. As presented in Section 3.3, *Noise*, estimated noise levels would not be incompatible with
- 36 existing land uses. Therefore, implementation of any one of the alternatives would result in no impact to
- 37 land use.
- 38 3.1.1.6 Recreation
- Recreational areas are defined as public or private lands that provide for relaxation, rest, activity, education,
- 40 or other opportunities for leisure services and community support that lead to an enhanced quality of life.
- 41 Lands adjacent to the CMAGR offer recreational uses such as hiking, camping, bird watching, hunting,
- 42 rock climbing (Navy 2013a). The Bradshaw Trail and the Salton Sea State Park are adjacent to the northern

- and northwestern boundaries, respectively, of the CMAGR, while the Salton Sea National Wildlife Refuge
- 2 is approximately 5 miles to the southwest of the CMAGR and portions of the Bradshaw Trail encroach into
- 3 the CMAGR boundary. Public access is not permitted within the CMAGR; there are no recreational
- 4 opportunities within the range's boundaries. There would be no impact to the public's ability to recreate in
- 5 existing recreational areas adjacent to the CMAGR. As presented in Section 3.3, *Noise*, estimated noise
- 6 levels would not be incompatible with existing recreational uses. Therefore, implementation of any one of
- 7 the alternatives would result in no impact to recreation.
- 8 3.1.1.7 Socioeconomics and Environmental Justice
- 9 Implementation of the Proposed Action would not create any new jobs and no change to existing economic
- conditions would occur. Therefore, implementation of any one of the alternatives would result in no adverse
- 11 socioeconomic impacts.
- 12 EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income
- 13 Populations, requires federal agencies to consider human health and environmental conditions in minority
- and low-income communities. EO 13045, Protection of Children from Environmental Health Risks and
- 15 Safety Risks helps ensure that federal agencies' policies, programs, activities, and standards address
- environmental health and safety risks to children. The project area is located above a military range
- restricted to the public. Children are not present and there is no permanent military family housing or
- civilian housing at or near the project area. As presented in Section 3.3, *Noise*, estimated noise levels would
- 19 not exceed established thresholds at off-installation areas. Therefore, implementation of any one of the
- alternatives would result in no disproportionate impact to minority populations or the health and safety of
- 21 children.
- 22 3.1.1.8 Ground Transportation
- 23 The Proposed Action would not involve any site improvements, the construction of any new facilities, or
- 24 any increase in personnel or activities that would place an additional temporary or permanent demand on
- 25 the regional surface transportation network. Niland-Blythe Road and Gas Line Road receive periodic
- 26 commercial use to service transmission and gas pipe lines that cross the range through R-2507N.
- 27 Commercial entry to the CMAGR to service these utilities is only on an as-authorized basis. These
- 28 commercial trips would continue to be scheduled to avoid potential conflicts. Furthermore, because the
- 29 Proposed Action would not change the number of sorties in the CMAGR, there would be no potential
- increase in traffic volumes on roadways near the air installations from which the CMAGR training flights
- 31 originate. Therefore, implementation of any one of the alternatives would result in no impact to ground
- 32 transportation.
- 33 3.1.1.9 Utilities
- 34 No utility infrastructure would be constructed, and no additional utility usage would be required for
- implementation of the Proposed Action. Under the No-Action Alternative, there would be no increase in
- 36 utility demand. Therefore, implementation of any one of the alternatives would result in no impact to
- 37 utilities.
- 38 3.1.1.10 Visual
- 39 The Proposed Action would not alter the existing visual setting of the project area and vicinity as the setting
- 40 would continue to support on-going military aviation and ground-based training. Furthermore, the Proposed
- 41 Action would not alter the number or type of existing training exercises within the CMAGR. Moreover,
- 42 post-2200 (10:00 P.M.) HE ordnance deliveries would occur at targets to the northeast of the Chocolate

- 1 Mountains effectively visually screening off-installation populations located to the west/southwest of the
- 2 CMAGR (refer to Figure 1-2). Therefore, implementation of any one of the alternatives would result in
- 3 negligible impacts to visual resources.

3.2 AIRSPACE AND AIR TRAFFIC

3.2.1 Definition of Resource

4

- 5 The nation's airspace is designed and managed by the Federal Aviation Administration (FAA) and is
- 6 intended to meet both the individual and common needs of all military, commercial, and general aviation
- 7 interests. All airspace is classified according to the operating and flight rules that apply to the use of each
- 8 area. Classification of airspace areas is dependent on (1) the complexity or density of aircraft operations,
- 9 (2) the nature of those operations, (3) the level of safety required, and (4) national and public interest.
- 10 Airspace management impact analysis considers the implications of the Proposed Action relative to special
- 11 use airspace (SUA), civilian and military flight corridors, and civilian and military airfields.
- 12 Air traffic refers to the movement of aircraft through airspace. Airspace and the control of air traffic are
- 13 closely regulated for safety and security reasons. As such, the FAA regulates all aircraft to define
- 14 permissible uses of designated airspace, and to control use within the airspace. A Restricted Area is airspace
- established under 14 CFR § 73 provisions, within which the flight of aircraft, while not wholly prohibited,
- is subject to restriction. Penetration of Restricted Areas by non-participating aircraft without authorization
- 17 from the using or controlling agency may be extremely hazardous to the aircraft and its occupants.

18 3.2.2 Affected Environment

- 19 The region of influence (ROI) for airspace and air traffic includes the existing R-2507 airspace and the
- 20 surrounding airspace that supports regional military and civilian aviation activities. The Proposed Action
- 21 would be implemented within an interrelated network of SUA that is located above and adjacent to
- 22 numerous training ranges (Figure 3.2-1). R-2507 overlies the majority of CMAGR, and is surrounded by
- the Abel North, Abel South, Abel East, and Kane East Military Operating Areas, As shown on Figure 3.2-1,
- 24 numerous military, civilian (both public and private), and joint military/civilian airfields are located
- adjacent to the project area.
- 26 Commercial air traffic traveling to and from southern California airports passes through the ROI. General
- 27 aviation aircraft operating from various public and private airfields also transit the area. Low-altitude
- airways (also known as "Victor" airways) accommodate civilian aircraft below approximately 18,000 ft
- above MSL. Low-altitude airways near the project area generally run in an east/west direction and are
- 30 located to the north of the CMAGR and to the south of the Naval Air Facility El Centro. Also, a low-altitude
- airway crosses the Kane West, Kane East, and Kane South Military Operating Areas along a generally
- northwest to southeast axis (Figure 3.2-1). High-altitude jet routes (i.e., between approximately 18,000 ft
- above MSL and 45,000 ft above MSL) are located outside the ROI and run in an east/west direction to the
- north of the CMAGR and to the south of Naval Air Facility El Centro (Navy 2013a).
- 35 Supersonic flight is currently limited to a portion of R-2301W (located southeast of MCAS Yuma). This
- 36 current supersonic area is a relatively small amount of airspace and does not support all facets of tactical
- jet training or allow ordnance employment within this section of the range (NAVFAC SW 2017a).

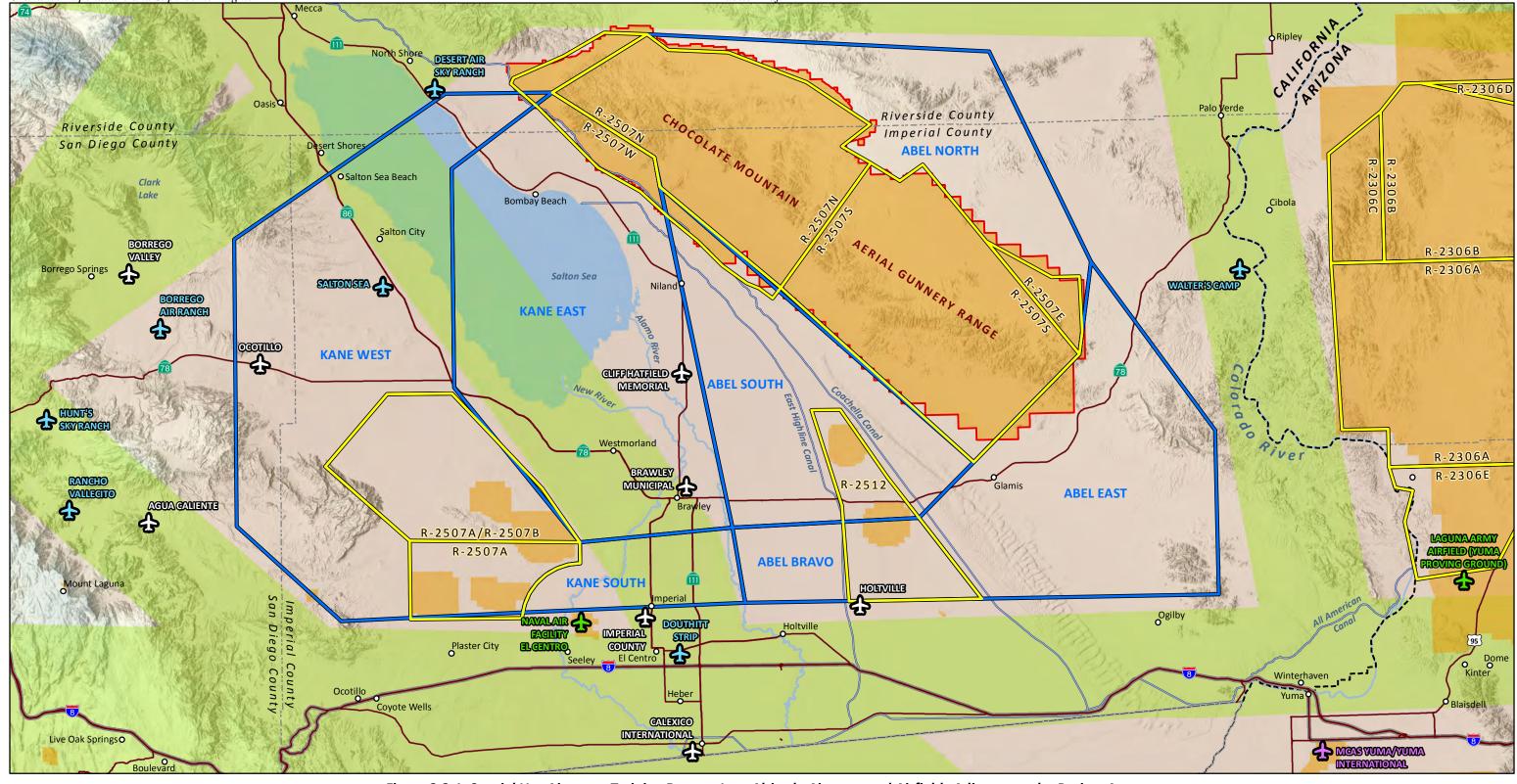
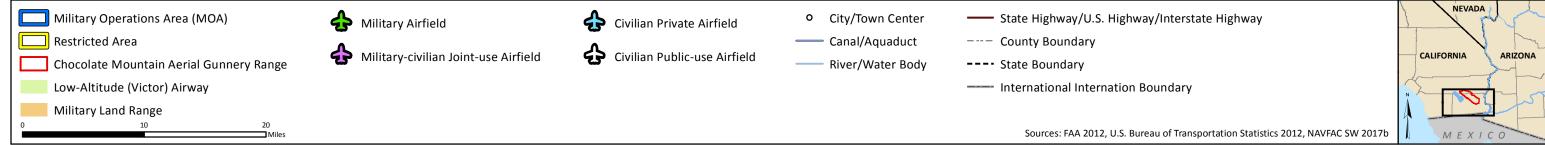


Figure 3.2-1. Special Use Airspace, Training Ranges, Low-Altitude Airways, and Airfields Adjacent to the Project Area





1 3.2.3 Environmental Consequences

2 3.2.3.1 Alternative 1

- 3 Alternative 1 would not alter the existing configuration of the R-2507 airspace and there would be no
- 4 change in the number of sorties or in the type or amount of HE ordnance delivered at designated target
- 5 areas at the CMAGR. Furthermore, Alternative 1 would not involve any change in the location or
- 6 dimensions of any existing target areas. Alternative 1 would introduce supersonic flight within R-2507.
- 7 Supersonic flight operations would generally last no longer than approximately 2 minutes, and the
- 8 introduction of supersonic flight to the R-2507 airspace would not involve any change in total flight
- 9 operations or supersonic flights in any other airspace managed by MCAS Yuma. Therefore, implementation
- of Alternative 1 would result in less than significant impacts to airspace and air traffic.

11 3.2.3.2 Alternative 2

- 12 Under Alternative 2, the impact to airspace and air traffic would be similar as presented for Alternative 1.
- The sole difference is that Alternative 2 would lift the restrictions on HE ordnance use only during WTI
- 14 Course training and operations. Supersonic flight would be authorized in the same manner as described for
- 15 Alternative 1, as described in Section 2.2.2, Airspace Activities. Airspace configuration, sorties, HE
- ordnance, and target areas would be the same as under existing conditions. Therefore, implementation of
- 17 Alternative 2 would result in less than significant impacts to airspace and air traffic.

18 3.2.3.3 No-Action Alternative

- 19 Under the No-Action Alternative, the USMC would not eliminate schedule restrictions on the delivery of
- 20 HE ordnance at existing targets within the CMAGR and would not authorize supersonic flight in the
- 21 existing airspace overlying the CMAGR. Therefore, there would be no change to the existing training
- operations at the CMAGR and associated airspace, and airspace and air traffic would not be affected.

3.3 Noise_____

23 3.3.1 Definition of Resource

- 24 The noise impacts of the Proposed Action were evaluated in the *Noise Analysis*, *Post-2200 High Explosive*
- 25 Ordnance Expenditure and Supersonic Flights (i.e., the "noise report") (NAVFAC SW 2018; Appendix
- 26 B). The noise report provides a detailed discussion of the basic characteristics of noise, noise modeling
- 27 methods, and the noise impacts of the action alternatives.
- Noise is measured in terms of decibels (dB), a logarithmic unit that represents the intensity of a sound. A
- sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely
- quiet listening conditions. Normal speech has a sound level of approximately 60 dB; sound levels above
- 31 120 dB begin to be felt inside the human ear as discomfort. The minimum change in the sound level of
- individual events that an average human ear can detect is about 1 dB (Mills 1960; Blauert 1997). On
- average, a person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's
- loudness, and this relation holds true for both loud and quiet sounds.

¹ A scale of measurement that displays the value of a quantity in terms of orders of magnitude.

- I In California, Community Noise Equivalent Levels (CNEL) are typically used for the evaluation of
- 2 community noise effects (i.e., long-term annoyance and compatible land uses). CNEL is a composite metric
- 3 that accounts for all noise events over a 24-hour period. To account for increased human sensitivity to noise
- at night, a 10-dB "penalty" (or adjustment) is applied to nighttime events (2200 to 0700 [10:00 P.M. to 7:00
- 5 A.M.]), and a 5-dB penalty is applied to flights occurring from 1900 to 2200 (7:00 P.M. to 10:00 P.M.).
- 6 CNEL is expressed in terms of "A-weighted" decibels (dBA).
- 7 For HE ordnance and sonic booms, the relevant noise metric is C-weighted Day-Night Average Sound
- 8 Level (CDNL). CDNL is used for larger impulsive noises such as those from explosions, which are short
- 9 duration sounds with high onset-rates. "C-weighting" is used because it emphasizes the lower part of the
- 10 frequency spectrum where sounds from explosions have more energy. Because of their low frequency,
- impulsive sounds may often be "felt" as much as they are heard. CDNL is expressed as C-weighted decibels
- 12 (dBC). Land use recommendations to mitigate noise effects would be triggered if a CDNL of 62 dBC or
- 13 more were to extend beyond a range boundary to encompass noise-sensitive land uses (NAVFAC SW
- *14* 2018).

15

3.3.2 Affected Environment

- 16 The ROI for noise includes the CMAGR and existing noise-sensitive receptors lying outside of the range
- boundary that may be affected by the Proposed Action. The potentially noise-sensitive receptors consist of
- a mix of residential, religious, educational, recreational, and health-related sites. The Salton Sea National
- Wildlife Refuge and the Salton Sea State Park, both located west of the project area, were also identified
- as noise-sensitive areas.
- 21 The contribution to the ambient noise environment from military operations is primarily from aircraft and
- 22 ordnance delivery. Figure 3.3-1 presents baseline dBC contours associated with aviation-based ordnance
- delivery. As shown, 62 dBC contours are contained entirely within the boundaries of the CMAGR.
- Non-military man-made sources of noise in the region primarily include roadway and rail traffic,
- 25 commercial and industrial operations (including agricultural activity and equipment), human activities (for
- example, off-road vehicle operation, property landscaping or maintenance) as well as operating heating,
- ventilation, and air conditioning equipment at residences or agricultural land uses where such activities
- 28 occur. Natural sounds include seasonal or year-round contribution from present wildlife species, with
- 29 examples such as birdsong and insect activity (for example, cricket or beetle chirps). Livestock and
- domesticated animals (for example, horses, dogs), while associated with human activity, might also be
- considered part of the natural sound environment. Wind passing through ground vegetation also produces
- audible sound contribution, which can even dominate a background sound environment when sustained
- average wind speeds are of sufficient magnitude (Navy 2013a).

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² A-weighting reduces the decibel values of low-frequency sounds to better approximate sounds as perceived by the human ear.

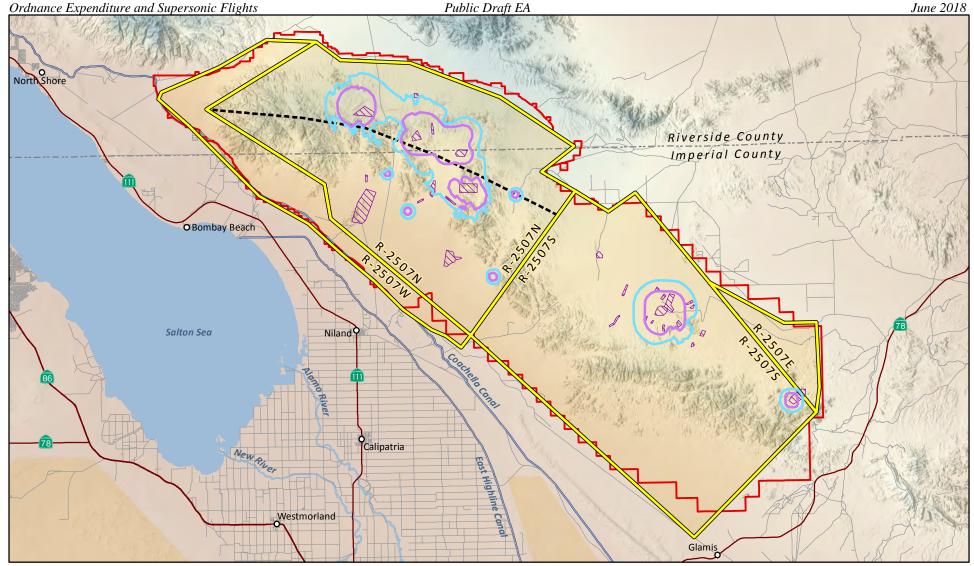
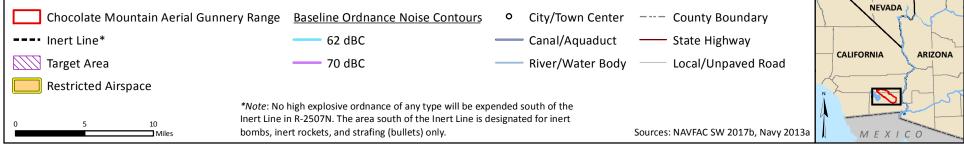


Figure 3.3-1. Baseline C-weighted Noise Contours



1 3.3.3 Environmental Consequences

2 3.3.3.1 Alternative 1

3 Overview

- 4 Under Alternative 1, existing flight operations and ordnance delivery would be shifted into currently
- 5 restricted nighttime hours (i.e., 2200 0600 [10:00 P.M. 6:00 A.M.]). Activities associated with this shift
- 6 would result in an incremental increase in CNEL (aircraft noise) and CDNL (ordnance delivery) due to the
- 7 additional weighting these metrics place on noise that occurs during nighttime hours. Noise impacts
- 8 associated with Alternative 1 would also arise from the introduction of supersonic flights, which would
- 9 result in sonic booms as aircraft exceed the speed of sound within the R-2507 airspace.

10 HE Ordnance

- The number of sorties that can be shifted to 2200 0600 (10:00 P.M. 6:00 A.M.) is constrained by the need
- to recover aircraft before the closure of local airfields, which normally occurs at 2330 (11:30 P.M.). The
- noise report analyzed a maximum shift of 10 percent of sorties into the 2200 0600 (10:00 P.M. 6:00 A.M.).
- 14 This shift would result in an incremental increase of 1.5 dBA. This increase, which is slightly above the
- 15 minimum change in the sound level of individual events that an average human ear can detect (i.e., 1 dB),
- would be less than significant.

17 Supersonic Flights and Sonic Booms

- Supersonic flight occurs when an aircraft flies faster than the speed of sound (approximately 767 miles per
- hour at sea level). When an aircraft achieves supersonic speeds, the aircraft creates a sonic boom, which is
- a thunder-like noise a person on the ground hears and feels when an aircraft or other type of aerospace
- 21 vehicle flies overhead faster than the speed of sound. Air reacts like fluid to supersonic objects. As those
- 22 objects travel through the air, molecules are pushed aside with great force and this forms a shock wave,
- much like a boat creates a wake in water. The bigger and heavier the aircraft, the more air it displaces.
- 24 The shock wave forms a "cone" of pressurized or built-up air molecules, which move outward and rearward
- in all directions and extend all the way to the ground. As this cone spreads across the landscape along the
- 26 flight path, it creates a continuous sonic boom along the full width of the cone's base. The sharp release of
- 27 pressure, after the buildup by the shock wave, is heard as the sonic boom. All aircraft generate two cones,
- at the nose and at the tail. They are usually of similar strength and the time interval between the two as they
- 29 reach the ground is primarily dependent on the size of the aircraft and its altitude (National Aeronautics and
- 30 Space Administration [NASA] 2017).
- While some people on the ground may perceive the sound as a single sonic "boom," many sonic booms are
- easily heard as distinct "double" booms. This is the result of the two separate cones generated, at the nose
- and the tail of the aircraft (NASA 2017).
- There are several factors that can influence sonic booms weight, size, and shape of the aircraft or vehicle,
- 35 plus its altitude, attitude, and flight path, and weather or atmospheric conditions. Altitude determines the
- distance shock waves travel before reaching the ground, and this has a significant effect on intensity. As
- 37 the shock cone gets wider, and it moves outward and downward, its strength is reduced. Generally, the
- 38 higher the aircraft, the greater the distance the shock wave must travel, reducing the intensity of the sonic
- 39 boom (NASA 2017).
- 40 Maximum intensity for traditional supersonic aircraft is directly beneath the aircraft and decreases as the
- 41 lateral distance from the flight path increases, until it ceases to exist. The lateral spreading of the sonic

- 1 boom depends upon altitude, speed, and the atmosphere and is independent of the vehicle's shape, size,
- and weight (NASA 2017).
- 3 Sonic booms are measured in pounds per square foot (psf) of "overpressure." This is the amount of the
- 4 increase that occurs over the normal atmospheric pressure which surrounds us (2,116 psf/14.7 pounds per
- 5 square inch). At one pound of overpressure, no damage to structures would be expected. Supersonic aircraft
- 6 flying at normal operating altitudes produce overpressures of 1 to 2 psf. The change in air pressure
- 7 associated with a sonic boom is only a few psf about the same pressure change experienced riding an
- 8 elevator down two or three floors. It is the rate of change, the sudden changing of the pressure, which makes
- 9 the sonic boom audible (NASA 2017).
- The noise report prepared in support of this EA (NAVFAC SW 2018) analyzed the noise impacts of sonic
- booms from proposed supersonic flights (Figure 3.3-2). As shown, the 45 dBC contour would be contained
- entirely within the CMAGR, while the 40 dBA would extend outside of the CMAGR boundary only on the
- 13 northern side of the range, away from sensitive receptors, which are located primarily to the south and west.
- Overpressures (psf) would not exceed 2.27 psf while the F-35Bs are flying supersonic above 25,000 feet
- 15 MSL.
- 16 Combined Noise Impact
- 17 The combined effect of supersonic flight and HE ordnance expenditure would result in a total of 62.03 dBC
- at target areas, and the 62 dBC contour would not extend beyond the boundaries of the CMAGR. The
- 19 combined effect of new noise would generate noise levels far below the threshold for community noise
- 20 impacts within their respective noise metrics while still within the range boundaries. Given that noise
- 21 attenuates over distance, noise levels outside the CMAGR would be even lower. Therefore, noise impacts
- 22 under Alternative 1 would be less than significant.
- 23 3.3.3.2 Alternative 2
- 24 Although post 2200 (10:00 P.M.) ordnance delivery and supersonic flights would be restricted to the WTI
- 25 Courses under Alternative 2, the CNEL results would be generally the same as for Alternative 1, since this
- 26 metric considers the "busiest month," which would coincide with the WTI Courses (NAVFAC SW 2018).
- 27 The noise impacts from supersonic flight would be consistent with Alternative 1, while the noise from
- 28 ordnance delivery would be lower than Alternative 1. As a result, the combined CDNL for Alternative 2
- would be lower than Alternative 1. Therefore, noise impacts under Alternative 2 would be less than
- 30 significant.
- 3.3.3.3 No-Action Alternative
- 32 Under the No-Action Alternative, the USMC would not eliminate schedule restrictions on the delivery of
- 33 HE ordnance at existing targets within the CMAGR and would not authorize supersonic flight in the
- existing airspace overlying the CMAGR. Therefore, there would be no change to the existing training
- 35 operations at the CMAGR and associated airspace, and no effect relative to noise.

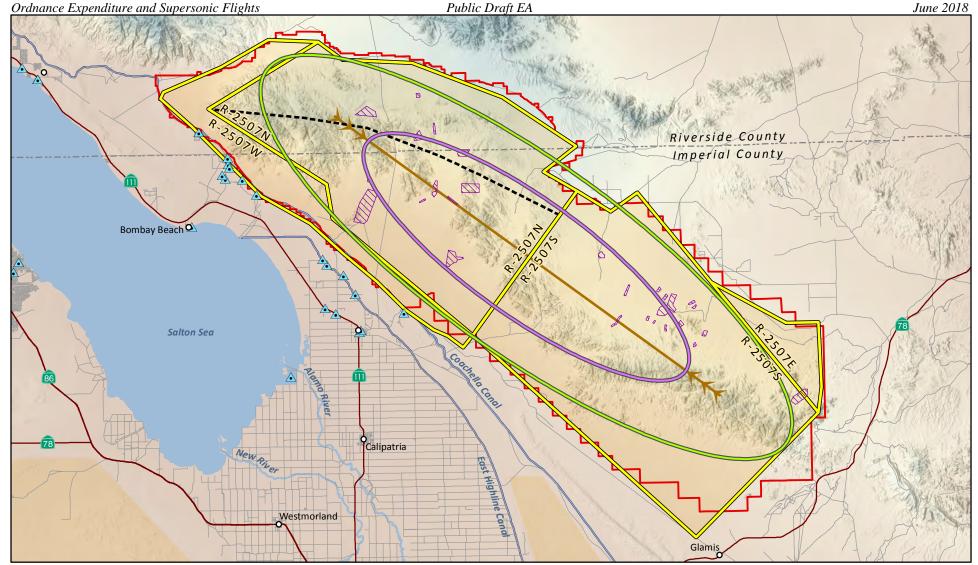
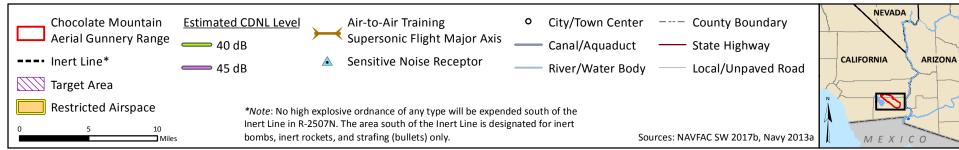


Figure 3.3-2. Sonic Boom Noise Contribution from Proposed Supersonic Flight



3.4 CULTURAL RESOURCES

3.4.1 Definition of Resource

1

23

- 2 Cultural resources is an inclusive label used to encompass any historic properties or traditional cultural
- 3 properties and sacred sites valued by traditional communities (most often associated with Indian Tribes).
- 4 Cultural resources are finite, nonrenewable resources, whose salient characteristics are easily diminished
- by physical disturbance; certain types of cultural resources also may be negatively affected by visual,
- 6 auditory, and atmospheric intrusions.
- 7 Historic properties are defined in the federal regulations outlining Section 106 of the National Historic
- 8 Preservation Act (NHPA), as amended (54 USC 306108 et seq.), 36 CFR 800, as prehistoric and historic
- 9 sites, buildings, structures, districts, or objects listed or eligible for listing in the National Register of
- 10 Historic Places (NRHP), as well as artifacts, records, and remains related to such properties. Compliance
- with Section 106 of the NHPA, which directs federal agencies to consider the effect of a federal undertaking
- 12 on a historic property, is outlined in the Advisory Council on Historic Preservation's regulations, *Protection*
- of Historic Properties (36 CFR § 800). A traditional cultural property can be defined generally as one that
- is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living
- community that are rooted in that community's history and are important in maintaining the continuing
- cultural identity of the community.
- 17 To be eligible for the NRHP, a property must possess integrity of location, design, setting, workmanship,
- 18 feeling, and association, and meet the following criteria for evaluation in at least one area of significance
- as defined by the Secretary of the Interior's Standards for Evaluation (36 CFR 60):
- 20 (a) associated with events that have made a significant contribution to the broad patterns of American history; or
- 22 (b) associated with the lives of persons significant in our past; or
 - (c) embody the distinctive characteristic of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant or
- distinguishable entity whose components may lack individual distinction; or
- 26 (d) have yielded, or may likely yield, information important in prehistory or history.
- 27 In addition to historic significance, a cultural resource must also retain integrity, which is the ability to
- convey said historic significance. The NRHP criteria recognize sevens aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. A resource must retain several, if not all of these
- aspects, to be considered eligible for listing in the NRHP. For archaeological resources, eligibility is
- 31 generally determined under Criterion D for the ability to provide important information in prehistory and/or
- history. The assessment of integrity for archaeological properties depends on the data requirements of an
- applicable research design. This includes the identification of appropriate physical remains in an intact
- depositional (horizontal or vertical) context. Once a federal agency has determined a cultural resource to
- be significant, the agency has a responsibility to manage the resource as a historic property.
- While there are multiple laws, regulations, and EOs that govern the identification and management of
- 37 cultural resources at MCAS Yuma, the main regulatory drivers are Section 110 and 106 of the NHPA of
- 38 1966 [54 USC 300101 et seq.] and associated regulations [36 CFR 800]. Section 110 of NHPA requires all
- 39 federal agencies to identify historic properties on their landholdings while Section 106 of NHPA requires
- all federal agencies to consider the effects of their undertakings on historic properties and seek to avoid,

- *I* minimize, or mitigate adverse effects to these properties (36 CFR 800.1(a)). Section 106 also requires
- 2 agencies to consult with federally recognized Indian tribes and other stakeholders with a vested interest in
- the undertaking. MCAS Yuma coordinates with federally-recognized tribes on a recurring basis.
- 4 The ROI for cultural resources is the area within which the Proposed Action has the potential to affect
- 5 existing cultural resources. For the Proposed Action, the ROI is defined as:
 - the target locations within the CMAGR that would be directly impacted by ground-disturbing activities (these locations are already impacted by ordnance delivery, but scheduling restrictions would be eliminated); and
 - lands below the R-2507 airspace that would be subject to supersonic flight impacts.
- 10 Information on cultural resources within the affected environment was derived from conducting
- background research to identify NRHP and the State Register of Historic Places properties beneath the
- 12 affected airspace, National Historic Landmarks, National Battlefields, National Historic Trails, any cultural
- 13 landscapes, ghost towns, historic forts, or historic ranches recorded or known within the same area, and
- 14 American Indian Reservations, sacred areas or traditional use areas.

15 3.4.2 Affected Environment

- 16 The affected environment for cultural resources is based on the establishment of the area of potential effects
- 17 (APE) of an undertaking. An APE is defined in 36 CFR 800.16(d) as "the geographic area or areas within
- which an undertaking may directly or indirectly cause changes in the character or use of historic properties,
- if any such properties exist." The APE, and therefore the affected environment, for the Proposed Action
- includes the CMAGR lands and targets under the R-2507 airspace (see Figure 3.2-1).
- 21 All NRHP-listed properties under the existing R-2507 airspace were compiled, in addition to areas and
- 22 properties not listed in the NRHP that are known to have historical significance and cultural value. In
- 23 general, archaeological sites will not incur any effects as a result of the Proposed Action. However,
- 24 archaeological sites listed in the NRHP were included in the analysis, as some are standing structures and
- 25 rock art sites.
- 26 MCAS Yuma will notify the California State Historic Preservation Office (SHPO) regarding the Proposed
- 27 Action.

6

7 8

- 28 3.4.2.1 Prehistoric and Historic Setting
- 29 This brief outline of the cultural context for the Colorado Desert is drawn from Schaefer and Dalope's 2011
- 30 survey (Schaefer and Dalope 2011).
- 31 Regional Prehistory
- 32 The regional prehistory is divided into the Paleo-Indian (or Early), Archaic, and Late Prehistoric periods.
- 33 The Paleo-Indian period ranges from approximately 12,000 Before Christ (BC) to 5000 BC. This period is
- 34 represented by an artifact assemblage known as the San Dieguito complex that consists almost entirely of
- 35 flaked stone tools associated with a hunting and gathering economy, including the hunting of big game.
- 36 The Archaic period ranges from 5000 BC to Anno Domini (AD) 700. This period is generally characterized
- as a time when regional adaptations became well established within diverse local conditions, but these
- changes are not well represented in the Colorado Desert region.

- 1 The Late Prehistoric period in the Colorado Desert is represented by the Patayan cultural complex, which
- dates roughly from AD 700 to the 1770s. This period is characterized by marked changes in human
- 3 settlement patterns, economic system, and the artifact assemblage. Artifacts typically encountered from this
- 4 period include paddle and anvil ceramics and small projectile points indicative of adoption of the bow and
- 5 arrow. Subsistence included floodplain horticulture featuring maize, beans, squash, and other crops
- 6 (Schaefer and Dalope 2011).

7 History of the CMAGR Area

- 8 As early as 1539, the Spanish began to explore parts of California, and were the first Europeans to venture
- 9 into the region surrounding the Chocolate Mountains. Spanish exploration for the next 200 years was
- intermittent in this area as California was considered remote and difficult to access. In the late 1700s,
- various Spanish expeditions led by Father Francisco Garcés (1771), Pedro Fages (1772), and Captain Juan
- 12 Bautista de Anza (1774) established overland routes, opening up the region to travel, but the desert
- conditions were still too harsh for Euro-American settlement.
- 14 Development in the Colorado Desert was largely dependent on transportation and water. With the discovery
- of gold in California in 1848, an influx of immigrants from the east into California led to the establishment
- of wagon roads, a mail route, and a stage line along de Anza's route. By 1862, a route to Yuma from Dos
- 17 Palmas along the east side of the Salton Basin ran south of the Chocolate Mountains, and an overland stage
- 18 route from San Bernardino to La Paz skirted the northern edges of the Chocolate Mountains. By 1868, the
- 19 Castle Dome cutoff route through the Chocolate Mountains was in use. Transportation to and through the
- area advanced further with the 1872 construction of the Southern Pacific Railroad from Los Angeles to
- 21 present-day Indio and Yuma, and the 1881 linking of the Southern Pacific and the Atchison, Topeka, and
- 22 Santa Fe railroads. The railroads provided a quick and easy access to the Chocolate Mountains region for
- 23 mining, which was at its peak between 1890 and 1910, and again during the depression era of the 1930s.
- A canal along the old Alamo River channel was completed in 1901, carrying water from the Colorado River
- 25 to what was then renamed the Imperial Valley, providing a viable water source to support agricultural
- development and settlement. Population increased in the area, and El Centro was established in 1905. The
- 27 Salton Sea was inadvertently created when attempts to cut a new channel to relieve silting of the Alamo
- 28 Canal led to the accidental flow of the Colorado River into the Imperial Valley between 1904 and 1907.
- 29 Military training use of the CMAGR region began during World War II when General George S. Patton,
- 30 Jr., established the Desert Training Center/California-Arizona Maneuver Area, encompassing 18,000
- 31 square miles in southeastern California, western Arizona, and southern Nevada, for training in desert
- 32 survival and warfare. In addition to the Army's use of the area, the Navy established Camp Dunlap as a
- 33 Marine artillery training base, which expanded to include portions of the Chocolate Mountains and later
- 34 became the CMAGR. The CMAGR was initially established during World War II and has been
- indispensable for military aviation training ever since.
- 36 3.4.2.2 Cultural Resources Within the Affected Environment
- 37 Traditional Cultural Resources
- The APE does not contain any known traditional cultural properties or sacred sites. As part of this EA,
- 39 MCAS Yuma will notify federally-recognized Indian Tribes who assert ancestral ties to the CMAGR region
- 40 to identify traditional cultural resources in the APE.

1 Historic Buildings and Structures

- 2 There are no NRHP-listed historic buildings or structures located under the R-2507 airspace (National Park
- 3 Service [NPS] 2015). There are no known sites having cultural value, such as historic battlefields, ranches,
- 4 ghost towns, National Historic Landmarks, or National Historic Monuments under the airspace (California
- 5 Office of Historic Preservation [OHP] 2018a, 2018b; California Department of Parks and Recreation 2018;
- 6 Ghost Towns 2018a, 2018b; and NPS 2015, 2018). However, there are three known historic properties that
- 7 have historical significance located under and/or adjacent to the R-2507 airspace. These are the Bradshaw
- 8 Trail, a section of the Union Pacific Railroad, and the Coachella Canal.
- 9 The Bradshaw Trail, which was designated as a National Back Country Byway in 1992, is located
- approximately 0.3 mile from the R-2705 airspace boundary but within the CMAGR. The Bradshaw Trail
- was the first road to cross Riverside County to the Colorado River. It was created in 1862 as an overland
- stage route used mostly by miners. In 1868, the U.S. Post Office began to use this route to deliver mail to
- 13 Prescott, Arizona. The Bradshaw Trail was evaluated and was determined eligible for listing in the NRHP.
- 14 The California SHPO concurred with this determination in 2002 (Navy 2013a).
- 15 The Union Pacific Railroad, originally named the Southern Pacific Railroad, is located in the southwest
- corner of the R-2507 airspace. The Southern Pacific Railroad connected Los Angeles, California to Yuma,
- 17 Arizona by 1877. By 1881, this railroad connected to the Texas and Pacific Railroad in Texas which
- completed the second transcontinental railway in the U.S. In 1996, the Union Pacific Railroad and Southern
- 19 Pacific Railroad merged and in 2010 it was expanded to a double track corridor for 9 miles within Imperial
- 20 County (Navy 2013a).
- 21 The Coachella Canal is located along the southwestern to western boundary of the CMAGR under the
- 22 R-2507 airspace. The Coachella Canal, a spur of the All-American Canal, brought water to the Coachella
- Valley beginning in 1949, and its use continues to the present day (Navy 2013b). A report (Schaefer et al.
- 24 2003) stated that the 33-mile long portion of the canal had been recommended eligible, but that no formal
- determination has been made by the Bureau of Reclamation (Navy 2013b). During a cultural survey in
- 26 2013, a series of dirt and riprap berms were encountered adjacent to the Coachella canal (Navy 2013b).
- 27 MCAS Yuma determined that the NRHP-eligibility of these berms would remain undetermined, but they
- would be treated as eligible. The California SHPO concurred with that determination (California OHP
- 29 2014).

30 Archaeological Resources

- 31 There are no NRHP-listed or State Register of Historic Places-listed archaeological sites located under the
- 32 R-2507 airspace (NPS 2015; California OHP 2018c, 2018d).
- A total of 345 cultural resources have been identified at the CMAGR including prehistoric, historic, and
- 34 multi-component sites. The site types include a cabin, camp sites, mining camp sites, chipping stations,
- ceramic and lithic scatters, debitage, cleared circles, a fire ring, a geoglyph, a habitation site, a historic
- 36 complex, a lake area, mining and prospecting sites, petroglyph sites, quarries, pot-drop sites, roads, a rock
- cairn, other rock features and rock rings, survey markers, trails, trash dumps, well, and dump sites. Of the
- 38 345 archaeological sites located on the CMAGR, 252 have not been evaluated for NRHP eligibility, 84
- have been evaluated and were determined not to be eligible, and 9 resources were determined eligible for
- 40 listing in the NRHP (Navy 2013a).
- 41 Section 106 of the NHPA of 1966 empowers the Advisory Council on Historic Preservation to comment
- on federally initiated, licensed, or permitted projects affecting cultural sites listed or eligible for inclusion
- in the NRHP. Once cultural resources have been identified, significance evaluation is the process by which

- 1 resources are assessed relative to significance criteria for scientific or historic research, for the general
- 2 public, and for traditional cultural groups. Only cultural resources determined to be significant (i.e., eligible
- for listing in the NRHP) are protected under the NHPA.

3.4.3 Environmental Consequences

- 5 The regulations implementing Section 106 of the NHPA require that federal agencies consider the effects
- 6 (impacts) of their undertakings (proposed actions) on historic properties (cultural resources). Impacts on
- 7 cultural resources are considered significant if a historic property, as defined in 36 CFR 60.4, would be
- 8 physically damaged or altered, would be isolated from the context considered significant, or would be
- 9 affected by project elements that would be out of character with the significant property or its setting.
- 10 Analysis of potential impacts on cultural resources considers both direct and indirect impacts. Direct
- impacts may occur by: (1) physically altering, damaging, or destroying all or part of a resource; (2) altering
- characteristics of the surrounding environment that contribute to resource significance; (3) introducing
- visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or (4)
- neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by
- identifying the type and location of the Proposed Action and by determining the exact locations of cultural
- 16 resources that could be affected. Indirect impacts primarily result from the effects of project-induced
- population increases and the resultant need to develop new housing areas, utilities services, and other
- support functions necessary to accommodate population growth. Subsequent use of these activities and
- 19 facilities can disturb or destroy cultural resources.
- 20 Only those cultural resources that would reasonably be affected by noise impacts were included in the
- 21 analysis. These include architectural resources, archaeological resources with standing structures, and
- 22 traditional cultural properties. Prehistoric and historic archaeological sites lacking standing structures are
- 23 not included as they are generally ground surface or even subsurface deposits that would not be affected by
- 24 the Proposed Action. Some prehistoric archaeological sites could contain natural structures such as rock
- shelters or caves. These structures often house petroglyphs or pictographs, which are etched or painted onto
- 26 the rock surfaces. However, studies have found that these types of natural formations are not affected any
- 27 more by noise vibrations, such as sonic booms, than by natural erosion, wind, or seismic activity (Battis
- *28* 1983).

- 29 Overpressure values are used to provide a general picture of psf resulting from supersonic flight. Actual
- 30 overpressure varies based on maneuvers (climb/descent, turns, acceleration/deceleration) and specific
- 31 weather conditions (winds, vertical temperature/pressure profile). Aircraft maneuvers result in
- 32 concentration of sonic boom energy ("focus booms") that may exceed overpressure or defocusing that may
- result in lower overpressures. At 1 psf, the probability of a window breaking ranges from one in a billion
- 34 (Sutherland 1989) to one in a million (Hershey and Higgins 1976). At 10 psf, the probability of breakage
- is between one in a hundred and one in a thousand (Haber and Nakaki 1989). Damage to plaster is in a
- 36 comparable range but depends on the condition of the plaster. Adobe faces risks similar to plaster, but
- 37 assessment is complicated by adobe structures being exposed to weather, where they can deteriorate in the
- 38 absence of any specific loads (Sutherland 1989). Typical outdoor structures such as buildings, windmills,
- radio towers, etc., are resilient and routinely subject to wind loads far in excess of sonic boom pressures.
- 40 Foundations and retaining walls, which are intended to support substantive earth loads, are not typically at
- risk from sonic booms below 4 psf.

1 3.4.3.1 Alternative 1

- 2 Proposed post-2200 (10:00 P.M.) HE ordnance delivery would not result in new impacts to cultural
- 3 resources as existing known cultural resource sites are avoided, and there would be no change in ordnance
- 4 delivery locations.
- 5 Under Alternative 1, a sonic boom would occur with every supersonic event; however, not all of these sonic
- 6 booms would reach the ground. The CDNL for the sonic booms generated under Alternative 1 would be
- 7 lower than 45 dBC. For reference, normal restrictions on land use do not occur until the CNEL reaches 62
- 8 dBC. No effects to the three known historic properties (which are not buildings) that have historical
- 9 significance located under and adjacent to the R-2507 airspace is anticipated because overpressures (psf)
- would not exceed 2.27 psf when aircraft fly supersonic above 25,000 feet above MSL³. There would be no
- impacts to the three known historic properties. Therefore, there would be no significant impacts to cultural
- resources under Alternative 1.
- 13 3.4.3.2 Alternative 2
- 14 Under Alternative 2, schedule restrictions on HE ordnance deployment would only be lifted during the
- biannual WTI Course (twice annually, for a total of 14 days), and supersonic flights would be authorized
- within the CMAGR. Impacts to cultural resources would be identical to those under Alternative 1.
- 17 Therefore, there would be no significant impacts to cultural resources under Alternative 2.
- 18 3.4.3.3 No-Action Alternative
- 19 Under the No-Action Alternative, the USMC would not eliminate schedule restrictions on the delivery of
- HE ordnance at existing targets within the CMAGR and would not authorize supersonic flight in the
- 21 existing airspace overlying the CMAGR. Therefore, there would be no change to the existing training
- operations at the CMAGR and associated airspace, and cultural resources would not be affected.

3.5 BIOLOGICAL RESOURCES _____

3.5.1 Definition of Resource

- 24 Biological resources include plant and animal species, and the habitats within which they occur. This
- analysis focuses on species that are important to the function of ecosystems, are of special societal
- 26 importance, or are protected under federal or state law. These resources are commonly divided into the
- 27 following categories: Plant Communities, Fish and Wildlife, and Special Status Species.
- 28 Under the Proposed Action, the USMC proposes to (1) eliminate schedule restrictions on the delivery of
- 29 HE ordnance at existing targets within the CMAGR and (2) authorize supersonic flight in the existing
- airspace overlying the CMAGR. There would be no change to the existing targets, amount of HE ordnance
- 31 used, or restricted airspace boundaries under the Proposed Action. Therefore, plant communities would not
- 32 be impacted by the Proposed Action and are not analyzed further in this EA.

³ Overpressure value provided here is intended to provide a general picture of overpressures resulting from F-35B supersonic flight. Overpressure was computed using PCBoom software using a level non-accelerated flight (NAVFAC SW 2018).

I Biological resources are grouped and analyzed in this EA as follows:

- Wildlife includes the characteristic animal species that occur in the project area. Special
 consideration is given to bird species protected under the Migratory Bird Treaty Act and EO 13186,
 Responsibilities of Federal Agencies to Protect Migratory Birds. Special status wildlife species are
 discussed in more detail below.
- Special Status Wildlife Species are those animal species that are listed, have been proposed for listing, or are candidates for listing as threatened or endangered under the federal Endangered Species Act (ESA), the California ESA, and other species of concern as recognized by state or federal agencies.
- The ROI for biological resources is defined as the area that encompasses potential direct and indirect project effects. The ROI includes:
 - The target locations within the CMAGR that would be directly impacted by ground-disturbing activities (these locations are already impacted by ordnance delivery, but scheduling restrictions would be eliminated).
 - The R-2507 airspace and lands below the airspace that would be subject to supersonic flight impacts.

3.5.2 Affected Environment

18 3.5.2.1 Wildlife

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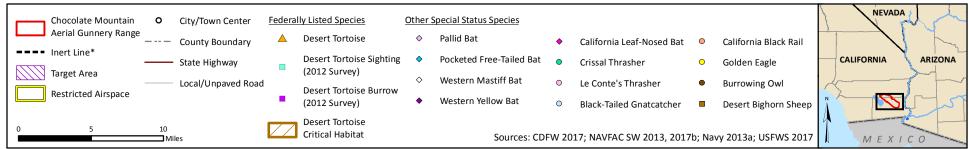
13 14

15 16

- Wildlife within the project area is typical of that found throughout much of the Sonoran Desert region of
- 20 southeast California. Sonoran Desert species are adapted to survive under harsh environmental conditions,
- 21 predominantly low, episodic and seasonal rainfall, and generally high, but highly variable temperatures.
- 22 Most species have developed physiological adaptations and behaviors that allow them to survive on limited
- amounts of water.
- 24 The CMAGR largely lacks surface waters for wildlife with the exception of ephemeral pools and drainage
- channels that contain water after storm events. The California Department of Fish and Wildlife (CDFW)
- 26 historically managed 26 wildlife guzzlers within the CMAGR, principally to provide supplemental water
- for desert bighorn sheep (Ovis canadensis nelsoni) and desert mule deer (Odocoileus hemionus eremicus)
- in the Chocolate Mountains (Bureau of land Management [BLM] 2009; MCAS Yuma 2017). In 2009, the
- 29 USMC, BLM, U.S. Fish and Wildlife Service (USFWS), and CDFW approved the installation of eight
- additional guzzlers; all have been completed (BLM 2009).
- 31 Reptile species that are known to occur in the project area include Sonoran gopher snake (Pituophis
- 32 catenifer affinis), western diamondback (Crotalus atrox), Colorado Desert sidewinder (Crotalus cerastes
- 33 laterorepens), red coachwhip (Masticophis flagellum piceus), Great Basin whiptail (Cnemidophorus tigris
- 34 tigris), northern desert iguana (Dipsosaurus dorsalis dorsalis), common side-blotched lizard (Uta
- 35 stansburiana), and common chuckwalla (Sauromalus ater) (MCAS Yuma 2017).
- 36 The project area is approximately 6 miles east of the Salton Sea. The Salton Sea is home to a great diversity
- 37 of bird species and a stopover for many other migratory bird species. Although migratory bird species
- transit through the project area, bird species are not likely to use the project area as a long-term stopover
- during migration because of the lack of permanent water sources and forested areas. Resident bird species
- 40 known to occur in and utilize the project area include lesser nighthawk (*Chordeiles acutipennis*), verdin
- 41 (Auriparus flaviceps), mourning dove (Zenaida macroura), Gambel's quail (Callipepla gambelii), ladder-

- 1 backed woodpecker (Picoides scalaris), turkey vulture (Cathartes aura), red-tailed hawk (Buteo
- *jamaicensis*), and loggerhead shrike (*Lanius ludovicianus*) (MCAS Yuma 2017; NAVFAC SW 2013).
- 3 Common desert mammals that are known to occur in the project area include black-tailed jackrabbit (Lepus
- 4 californicus), round-tailed ground squirrel (Spermophilus tereticaudus), white-tailed antelope squirrel
- 5 (Ammospermophilus leucurus), kangaroo rats (Dipodomys spp.), and desert wood rat (Neotoma lepida)
- 6 (MCAS Yuma 2017; NAVFAC SW 2013). Desert mule deer, coyote (Canis latrans), bobcat (Lynx rufus),
- 7 and mountain lion (Puma concolor) are also known to occur in and/or transit the project area; however,
- 8 these larger mammals are most likely to reside in areas with high amounts of shelter/cover, water, and
- 9 vegetation. The desert bighorn sheep occurs in the CMAGR in open, rocky, and steep habitats. Multiple bat
- species, including the pallid bat (Antrozous pallidus), western mastiff bat (Eumops perotis californicus),
- and pocketed free-tailed bat (Nyctinomops femorosaccus) are likely to occur and forage throughout the
- 12 project area.
- 13 3.5.2.2 Special Status Wildlife Species
- 14 A California Natural Diversity Database (CNDDB) (CDFW 2018a) query of known occurrences of special
- status wildlife species in the vicinity of the project area was conducted for this analysis (Figure 3.5-1 and
- 16 Table 3.5-1). The CNDDB inventories all federally and state listed plants and animals, all species that are
- candidates for listing, all species of special concern, and those species that are considered "sensitive" by
- 18 government agencies and the conservation community.
- Golden eagles (*Aquila chrysaetos*) are known to occur in the vicinity of the project area (Figure 3.5-1).
- 20 They nest on cliffs and in large trees in mountainous areas and forage over rolling foothills and valleys.
- 21 Potential golden eagle foraging habitat occurs in the project area. They are most likely to occur in the area
- during migration in spring and fall.
- 23 As a migrant, Swainson's hawks (*Buteo swainsoni*) likely occur throughout CMAGR during spring and fall
- 24 migration periods but would not nest in the project area (NAVFAC SW 2013).
- 25 Loggerhead shrikes (Lanius ludovicianus) are likely to nest in desert woodlands and forage throughout
- wooded portions of the CMAGR (NAVFAC SW 2013).
- 27 Burrowing owls (Athene cunicularia) were detected in 14 different locations on the CMAGR in 2012
- 28 (NAVFAC SW 2013). Burrowing owls are most often detected at caliche caves on the CMAGR (MCAS
- 29 Yuma 2017). Unlike other owls, burrowing owls are active during the day, especially in the spring when
- they gather food for their large broods. Burrowing owls typically nest and live in mammal burrows (USFWS)
- *31* 2003).

Figure 3.5-1. Special Status Wildlife Species Observations in the ROI



- 1 Several special status bat species likely forage at low altitudes in the R-2507 (Table 3.5-1 and Figure 3.5-1).
- 2 Bats are most active in the evening and dawn hours and roost in trees, caves, and other structures during
- 3 the day. Most species typically forage at low altitudes (<600 ft) and very rarely are known to occur at
- 4 maximum altitudes of approximately 10,000 ft above MSL (McCracken et al. 2008).

Table 3.5-1. Special Status Species in the Vicinity of the Project Area

Table 5.5-1. Special Status Species in the Vicinity of the Project Area							
Common Name Scientific Name	Federal	State	Habitat				
	Status	Status					
REPTILES Desert tortoise	1						
	T	T	Desert scrub ¹				
(Gopherus agassizii)							
MAMMALS	1	l					
Pallid bat	None	SSC	Desert wash, desert scrub, riparian woodland				
(Antrozous pallidus)			,, r				
Western mastiff bat	None	SSC	Various habitats				
(Eumops perotis californicus)	- 1,022						
Western yellow bat	None	SSC	Desert wash				
(Lasiurus xanthinus)	1,0110		Desert Wasii				
California leaf-nosed bat	None	SSC	Desert scrub				
(Macrotus californicus)	Ttone	bbc					
Pocketed free-tailed bat	None	SSC	Riparian scrub, desert scrub				
(Nyctinomops femorosaccus)	None	SSC	Riparian seruo, desert seruo				
Nelson's Desert bighorn sheep	None	FP	Onan desert mountains				
(Ovis canadensis nelsoni)	None	1.1	Open, desert mountains				
American badger	None	SSC	Desert dunes, desert wash, desert scrub ¹				
(Taxidea taxus)	None	SSC	Desert dunes, desert wash, desert scrub				
BIRDS							
Cooper's hawk	N	3371	W41411				
(Accipiter cooperii)	None	WL	Woodlands, agricultural areas ¹				
Golden eagle	DGG	ED	Forages in grassy and open shrub habitats, nests on cliffs and				
(Aquila chrysaetos)	BCC	FP	large trees				
Burrowing owl	Dag	aaa					
(Athene cunicularia)	BCC	SSC	Desert scrub, grasslands, agricultural areas ¹				
Swainson's hawk	200		Grasslands, desert scrub, agricultural areas ¹				
(Buteo swainsoni)	BCC	T					
Vaux's swift		~~~	Forages over many habitats, nests in tree cavities and artificial				
(Chaetura vauxi)	None	SSC	structures ¹				
Loggerhead shrike							
(Lanius ludovicianus)	BCC	SSC	Desert wash, desert scrub, riparian woodland ¹				
California black rail							
(Laterallus jamaicensis	BCC	Т	Dense marsh habitats				
coturniculus)	Bee	1	Denot maron nation				
Black-tailed gnatcatcher							
(Polioptila melanura)	None WL		Desert scrub, desert wash				
Crissal thrasher							
(Toxostoma crissale)	None SSC		Desert scrub, desert wash				
Le Conte's thrasher							
	None	SSC	Desert scrub, mesquite, riparian				
(Toxostoma lecontei)	1		, <u>, , , , , , , , , , , , , , , , , , </u>				

Notes: 1 Species observed during desert tortoise surveys conducted for another project (NAVFAC SW 2013).

Status: Federal (determined by USFWS): T = Threatened, E = Endangered, BCC = Bird of Conservation Concern.

State: T = Threatened, E = Endangered, SSC = Species of Special Concern, WL = Watch List, FP = Fully Protected.

Sources: CDFW 2018a,b; NAVFAC SW 2013.

1 Federally Listed Species

- 2 Based on the results of the CNDDB query (CDFW 2018a) and information from other sources (i.e.,
- 3 NAVFAC SW 2013; Navy 2013a; USMC 2012), the only federally listed species known to or likely to
- 4 occur within the project area is the desert tortoise (see Table 3.5-1). The desert tortoise is described in detail
- 5 below
- 6 The endangered southwestern willow flycatcher (*Empidonax traillii extimus*) is known to be a transient
- visitor to the CMAGR but requires dense riparian habitats that do not occur in the project area. Although
- 8 Yuma clapper rail (Rallus longirostris yumanensis), Desert pupfish (Cyprinodon macularius), and
- 9 razorback sucker (*Xyrauchen texanus*), all federally listed species, are known to occur in the vicinity of the
- 10 project area, habitats for these species (dense marsh and permanent water features) do not occur in the
- 11 project area and they would not be affected by the Proposed Action.

Desert Tortoise

- 12 The desert tortoise is the only federally listed species that occurs in the project area. With regard to desert
- tortoise impacts, the incidental take of desert tortoises during military training throughout CMAGR is
- authorized in the 1996 Biological Opinion (BO) (USFWS 1996).
- 15 Two species of desert tortoise have been described: Agassiz's desert tortoise and the Sonoran desert tortoise
- 16 (Gopherus morafkai). Agassiz's desert tortoise occurs in southeastern California, southern Nevada,
- 17 northwestern Arizona, and southwestern Utah. The Sonoran desert tortoise occurs east of the Colorado
- 18 River in Arizona and into Mexico (Murphy et al. 2011). Agassiz's desert tortoise, then known as the Mojave
- population of the desert tortoise, was federally listed as threatened in April 1990 (USFWS 1990). Agassiz's
- desert tortoise (referred to generically as the desert tortoise in the paragraphs below) is the threatened
- 21 species that occurs in the project area.
- 22 In the southern portion of its range, the desert tortoise occurs primarily in valleys, on alluvial fans or
- bajadas, rocky slopes, and in broad, well-developed washes with scattered shrubs and trees (USFWS 2011).
- 24 The desert tortoise occurs within a variety of desert scrub vegetation types; however, the primary
- characteristic plant community is creosote bush scrub (USFWS 2011). They occur from sea level to an
- elevation of 7,300 ft; however, the most favorable habitat occurs at elevations of approximately 1,000 to
- 27 3,000 ft. Tortoises dig their own burrows and spend much of their lifetime in these burrows (USFWS 2011).
- 28 The greatest threat to the desert tortoise is habitat loss and degradation caused by human activities including
- 29 urbanization, agricultural development, military training, recreational use, mining, livestock grazing, and a
- 30 lack of regulatory mechanisms (USFWS 2011). Other known threats to the species include predation by
- 31 common ravens (Corvus corax), canids (e.g., covotes [Canis latrans], kit foxes [Vulpes macrotis] and dogs
- 32 [Canis familiaris]), and golden eagles; collection by humans for pets or consumption; fire; collisions with
- vehicles on paved and unpaved roads; and mortality resulting from disease (e.g., upper respiratory tract
- 34 disease) (USFWS 2011).
- In 1994, the USFWS (1994) estimated tortoise populations to range from 5 to 175 tortoises per square mile
- throughout the range of the species. Previous surveys of desert tortoise critical habitat within the CMAGR
- have shown relatively high densities of desert tortoise (i.e., 35.7 per square mile) (USFWS 2012). More
- recent surveys in 2014, however, found a much lower density (i.e., 21.8 per square mile) in the same critical
- habitat (USFWS 2015). As shown in Table 3.5-2, there is a positive desert tortoise population trend within
- the CMAGR critical habitat between 2012 and 2017.

Table 3.5-2. Desert Tortoise Population Trends in Critical Habitat of the CMAGR					
Year	Desert Tortoise Estimated Density				
2010	35.7 tortoise/square mile				
2011	No Surveys Conducted				
2012	16.0 tortoise/square mile				
2013	18.8 tortoise/square mile				
2014	21.8 tortoise/square mile				
2015	19.0 tortoise/square mile				
2016	22.0 tortoise/square mile				
2017	24.0 tortoise/square mile				

Table 3.5-2. Desert Tortoise Population Trends in Critical Habitat of the CMAGR

Source: MCAS Yuma 2018.

- 1 Surveys of portions of the CMAGR in 2008 estimated that the surveyed areas supported zero to very low
- densities of tortoises (Woodman 2008). This is most likely due to the low elevations of these areas rather
- than human disturbance (NAVFAC SW 2013). The 2012 tortoise density estimates statistically compliment
- Woodman's 2008 results. Tortoises are most common (roughly 8 to 31 adult tortoises per square mile) in
- 5 portions of the CMAGR that overlap tortoise critical habitat. Tortoises occur in lower densities (roughly 3
- 6 to 8 adult tortoises per square mile) in the low hillside areas of the CMAGR; however, much of the surveyed
- 7 portions of the western side of the CMAGR were devoid of any evidence of tortoises (NAVFAC SW 2013)
- 8 (see Figure 3.5-1).

9 3.5.3 Environmental Consequences

- 10 This section evaluates the potential impacts to wildlife, including species of special status, resulting from
- supersonic aircraft overflights and noise and post-2200 hours (10:00 P.M.) delivery of HE ordnance.
- 12 3.5.3.1 Alternative 1
- 13 Wildlife
- 14 Under Alternative 1, air-to-ground HE ordnance delivery to existing targets within the CMAGR could occur
- at any time of the day or night, 365 days per year. Therefore, wildlife would be subject to air-to-ground HE
- ordnance noise and explosive impacts between 2200 (10:00 P.M.) and 0600 (6:00 A.M.). It is likely that
- 17 nocturnally active animals would experience the greatest impact from nighttime HE ordnance delivery
- 18 impacts; however, nighttime ground-to-ground ordnance delivery is already permitted in the CMAGR, so
- 19 nocturnal wildlife on the CMAGR are already exposed to visual and auditory nighttime impacts. In his
- 20 review of effects of military noise on wildlife, Larkin (1996) found that night-migrating birds that were
- 21 exposed to loud and sudden noise showed little change in flight patterns. As there would be no increase in
- the quantity of air-to-ground ordnance delivery at the CMAGR, impacts to wildlife from nighttime air-to-
- 23 ground HE delivery would be less than significant.
- As is currently the case, the potential exists for bat-aircraft strikes within R-2507 with an increase in
- 25 nighttime HE ordnance deliveries. However, bat-aircraft strikes would continue to be unlikely, as most bat
- species typically forage at low altitudes (<600 ft) and very rarely are known to occur at maximum altitudes
- of approximately 10,000 ft above MSL (McCracken et al. 2008). Therefore, there would be no increase in
- 28 the potential for bat-aircraft strikes under Alternative 1.
- 29 Studies of the effects of supersonic noise on birds and mammals have suggested that animals tend to
- 30 habituate to sonic booms and that long-term effects are not adverse. Captive and free-ranging ungulates

exhibited a startle response and increased heart rates upon initial exposure to a sonic boom and decreased 1 2 response with succeeding exposures suggesting habituation (Workman et al. 1992). Ellis et al. (1991) found that peregrine and prairie falcons' responses to simulated sonic booms were often minimal and never 3 4 associated with reproductive failure. Typically, birds quickly resumed normal activities within a few seconds following a sonic boom. While the falcons were noticeably alarmed by the sonic booms, the 5 negative responses were brief and not detrimental to reproductive success during the course of the study 6 7

(Ellis et al. 1991). Overall, impacts to wildlife from the proposed supersonic overflights would be minimal for the following reasons; (1) The probability of an animal, nest, or other defined location experiencing overflights more than once per day would be low due to the random nature of flight within airspace and the large area of land overflown; (2) There would be no change in the number or elevation of flight operations; (3) Noise from supersonic flights would be confined to areas currently experiencing impulsive noise (i.e., target areas) and supersonic flights generally last no longer than approximately 2 minutes; and (4) Average noise levels in the airspace would not increase markedly. As previously analyzed in USMC (2010), minor behavioral (e.g., moving short distances) and physiological responses (heart rate, alertness) can be anticipated in response to aircraft, but since they would occur with low frequency, they are not likely to affect breeding, foraging, migration, distribution, and other important activities. Therefore, impacts to wildlife from proposed supersonic overflights would be less than significant.

Special Status Wildlife Species

Desert Tortoise

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- Alternative 1 would not result in an increase in the quantity, magnitude, target location, or type of ordnance 20 employed at the CMAGR; the USMC only proposes to change the available scheduling of ordnance 21 deployment. The amount of daytime air-to-ground ordnance delivery would slightly decrease, as nighttime 22 ordnance delivery slightly increases. As desert tortoises tend to be more active in daylight hours (morning 23 24 and late afternoon), and spend more time in burrows during nighttime hours (U.S. Geological Survey 2016), 25 a positive impact to desert tortoises is expected under Alternative 1 due to less daytime ordnance delivery 26 when tortoises are more active and susceptible to physiological responses that may affect their fitness or survival (Bowles et al. 1999). 27
- 28 Noises that are close, loud, sudden, and combined with a visual stimulus produce the most intense reactions 29 in animals, but tortoises do not appear to be heavily affected by noise (Bowles et al. 1999). If desert tortoises perceive these disturbances as potential threats or sources of aggravation, these effects may lead to a 30 disruption of natural behaviors, may inhibit desert tortoises from utilizing suitable habitat in the vicinity of 31 such activities, may cause reluctance on the part of desert tortoises to move through an area subjected to 32 such disturbances, or may cause desert tortoises to be displaced from these areas.
- 33 34 However, since only 5 percent of a desert tortoise's life is spent aboveground (Nagy and Medica 1986),
- 35 there is little potential for noise or visual stimuli to impact tortoises for the vast majority of the year. These 36 effects are also unlikely to cause mortality, and tortoises temporarily affected would be able to resume
- 37
- normal behaviors and to use areas from which they have been deterred by the activity. As such, noise
- 38 associated with supersonic flights would not be likely to cause harm or behavioral effects that would rise
- to the level of take, as defined by the USFWS. 39
- Supersonic noise would occur in portions of desert tortoise critical habitat under R-2507. However, 40
- subsonic low-level flights already occur above desert tortoise critical habitat in R-2507. In controlled 41
- experiments, Bowles et al. (1999) found that desert tortoises show no detectable shift in activity after 42

- 1 exposure to repeated sonic booms. Unlike when a tortoise is touched or exposed to a flashing light, which
- 2 typically causes individuals to jerk, flee, and/or defecate, exposure to simulated sonic booms does not
- 3 induce any of these responses (Bowles et al. 1999). Additionally, assessments at the Nevada Test and
- 4 Training Range, which supports a large tortoise population, indicate that supersonic noise results in
- 5 negligible effects on tortoises (U.S. Air Force 2008).
- 6 Alternative 1 would not establish any new training ranges or target areas or result in additional ground
- 7 disturbance from current conditions. Therefore, Alternative 1 would have no impact on desert tortoise
- 8 critical habitat.

Other Special Status Wildlife Species

- 9 Other special status wildlife species have the potential to occur in the project area (see Table 3.5-1 and
- 10 Figure 3.5-1). No special status species have populations that are restricted to the project area or adjacent
- lands. Impacts to individual special status wildlife would be identical to those described above for wildlife.
- 12 Therefore, impacts to special status wildlife species under Alternative 1 would be less than significant.
- 13 3.5.3.2 Alternative 2
- 14 Wildlife
- 15 Impacts to wildlife under Alternative 2 would be nearly identical to those under Alternative 1, but overnight
- delivery of HE ordnance would only occur during the WTI Course (twice annually, for a total of 14 days).
- 17 Therefore, on a temporal scale, wildlife species would be subject to a lesser level of impact from overnight
- HE ordnance delivery. Therefore, Alternative 2 would not have significant impacts on wildlife.
- 19 Special Status Wildlife Species
- 20 Impacts to special status wildlife species under Alternative 2 would be nearly identical to those under
- 21 Alternative 1, but overnight delivery of HE ordnance would only occur during the WTI Course (twice
- annually, for a total of 14 days). Therefore, on a temporal scale, special status wildlife species, including
- desert tortoise, would be subject to a lesser level of impact from overnight HE ordnance delivery. Therefore,
- 24 Alternative 2 would not have significant impacts on special status wildlife species.
- 25 3.5.3.3 No-Action Alternative
- 26 Under the No-Action Alternative, the USMC would not eliminate schedule restrictions on the delivery of
- 27 HE ordnance at existing targets within the CMAGR and would not authorize supersonic flight in the
- 28 existing airspace overlying the CMAGR. Therefore, there would be no change to the existing training
- 29 operations at the CMAGR and associated airspace, and biological resources would not be affected.

3.6 PUBLIC HEALTH AND SAFETY

30 3.6.1 Definition of Resource

- The Commanding Officer, MCAS Yuma is responsible for the operations and administration of the
- 32 CMAGR. To minimize hazards to military personnel and the public, MCAS Yuma has developed and
- 33 implemented various plans and programs, notably Range and Training Areas Standard Operating
- 34 Procedures (i.e., Station Order 3710.6J) (MCAS Yuma 2013). This and other Station Orders provide
- measures to manage range and training areas (RTAs), discourage unauthorized entry into the installation,
- and comply with other safety-related requirements.

- 1 Weapon danger zones and surface danger zones have been developed within the CMAGR to laterally and
- 2 vertically contain projectiles, fragments, debris, and components resulting from the firing, launching, and/or
- detonation of ordnance to protect public health and safety.
- 4 The primary concern regarding flight safety is the potential for aircraft accidents. Such mishaps may occur
- as a result of mid-air collisions, collisions with man-made structures or terrain, weather-related accidents,
- 6 mechanical failure, or pilot error. Mishaps can also occur from air-to-ground or air-to-air ordnance;
- 7 ground-to-ground fires from artillery and mortars; expenditures of ground-to-air ordnance; ricochets from
- 8 surface-fired heavy machine guns; the use of other infantry weapons; high explosive detonations of
- 9 demolition charges; and maneuvers by tactical aircraft at night without illuminated recognition lights. Flight
- safety risks apply to military, civilian, and commercial aircraft.
- 11 The FAA is responsible for ensuring safe and efficient use of airspace by military and civilian aircraft and
- supporting national defense requirements. To meet these requirements, the FAA has established regulations
- 13 for airspace safety, developed airspace management guidelines, implemented a civil-military common
- system, and coordinated cooperative activities between the FAA and the DoD.

3.6.2 Affected Environment

- 16 3.6.2.1 Ground Safety
- 17 The Marine Corps employs and documents operational risk management at training ranges to identify and
- assess hazards and implement controls for all phases of training events. The requirements for air and ground
- safety of all civilians and military personnel, as well as the public at large, are outlined in these documents.
- 20 Explosive ordnance disposal (EOD) personnel routinely perform sweeps for potential unexploded ordnance
- 21 (UXO).

- 22 The CMAGR is closed to the public. A series of signs warning unauthorized personnel not to enter the RTA
- are posted along the range perimeter to protect the general public from intentional or accidental entry onto
- 24 the CMAGR. The signs are placed so an individual standing anywhere along the range perimeter would be
- able to see a sign when looking to the left or right. The warnings are written in both English and Spanish
- 26 (MCAS Yuma 2017).
- 27 The MCAS Yuma and Imperial Valley Sheriff's Office periodically conduct physical patrols of the range
- boundaries to remove trespassers, as do local and federal law enforcement officials. The MCAS Yuma
- 29 maintains access control gates at the entry and exit points to the CMAGR. In addition, the MCAS Yuma
- 30 conducts public outreach programs to raise awareness of the military training mission and associated
- 31 hazards (MCAS Yuma 2017).
- 32 Unauthorized personnel are not allowed on the CMAGR at any time, but there are occasions where
- trespassers or "scrappers" access the range despite patrols, arrests, verbal notices, and warning signs.
- 34 Scrappers enter the CMAGR without authorization for the purpose of removing salvageable materials such
- as aluminum, brass, and copper. Scrappers have been known to be armed and sometimes present a danger
- 36 to anyone who approach them. In accordance with Station Order 3710.6J directives, any live-fire exercises
- 37 are terminated until the trespassers are removed from the range. Unauthorized personnel and vehicles found
- within range boundaries or spotted by either an airborne crew or authorized person is reason to abort
- ordnance training operations in that area, thereby interfering with training activities. In calendar year 2015,
- 40 there were approximately 25 recorded incidences of unauthorized users penetrating the CMAGR boundary,
- resulting in the loss of 20 hours of training time (MCAS Yuma 2017).

1 3.6.2.2 Airspace Safety

- 2 Air traffic control for the R-2507 airspace and other SUA in the ROI is managed by MCAS Yuma
- 3 Combined Center and Radar Approach Control. By acting as a single unit of air traffic control
- 4 responsibility, MCAS Yuma enhances the safety of a myriad of training activities that take place in and
- 5 around the area ranges and airspace. Controllers familiar with military aircraft capabilities and experienced
- at handling aircraft emergencies continuously monitor the CMAGR airspace. Should any civilian or
- 7 unauthorized aircraft stray into or purposely enter the controlled airspace at the CMAGR, MCAS Yuma
- 8 has procedures to immediately halt all military training until the violating aircraft departs.
- 9 MCAS Yuma Station Order 3710.6J (MCAS Yuma 2013) defines the procedures and regulations for
- 10 Commands using the RTAs managed by MCAS Yuma, including the CMAGR. Station Order 3710.6J
- 11 specifies individual responsibilities; gives descriptions of available training ranges; provides instructions
- on how to schedule the RTA; and defines safety regulations for all live-fire, maneuver, and air operations
- within the RTA. As part of the Range Management Department, Operations Division, the Range Control
- Officer is responsible for range safety. The CMAGR Range Safety Officer and range inspectors serve as
- the direct representatives of the Range Control Officer for the enforcement of Station Order 3710.6J and
- safety standards throughout the RTA. MCAS Yuma schedules all or portions of seven Restricted Areas,
- including the R-2507 airspace, and has adopted specific air safety rules as directed in Station Order 3710.6J
- 18 (MCAS Yuma 2013).

19 3.6.3 Environmental Consequences

20 3.6.3.1 Alternative 1

- 21 Ground Safety
- 22 Under Alternative 1, the USMC would continue to implement safety protocols (see Section 3.6.2, Affected
- 23 Environment). These instructions prescribe standard operating procedures when using weapons to ensure
- safe and proper use of training areas and to avoid possible conflict with other military units, government
- agencies, non-participating aircraft, or civilians.
- 26 Because there would be no change in ordnance types or numbers, or ranges, there would be no change to
- 27 existing weapon danger zones and surface danger zones. All ranges would continue to achieve a 99.9999
- 28 percent design containment of the projectiles, fragments, debris, and components resulting from munitions
- 29 blasts. There would be no increase in health or safety risk to the public. MCAS Yuma would continue to
- 30 conduct EOD sweeps to clear UXO to the extent safe and practicable. As noted in Section 3.1.1.4,
- 31 Hazardous Materials and Waste, no change in MC is anticipated.
- 32 Unauthorized persons would continue to accidentally or knowingly trespass beyond the marked boundary
- of the installation, and therefore potentially be exposed to the effects of military training activities.
- 34 Airspace Safety
- 35 Air traffic control oversight would continue to be administered by MCAS Yuma Combined Center and
- Radar Approach Control to reduce the likelihood for aircraft mishaps to occur within the CMAGR. Training
- 37 operations would continue to abide by the regulations and procedures defined by MCAS Yuma Station
- Order 3710.6J to maximize safety. Therefore, implementation of Alternative 1 would not have a significant
- impact to public health and safety.

1 3.6.3.2 Alternative 2

- 2 Under Alternative 2, the relative risk to public health and safety would be similar as presented under
- 3 Alternative 1, as there would be no increase in ordnance use. Lifting the schedule limitations during the
- 4 WTI Courses would reduce the potential for overnight interactions with trespassers as compared to
- 5 Alternative 1; however, such incidences would continue to be handled in accordance with current protocols.
- 6 Therefore, implementation of Alternative 2 would not have a significant impact to public health and safety.

7 3.6.3.3 No-Action Alternative

- 8 Under the No-Action Alternative, the USMC would not eliminate schedule restrictions on the delivery of
- 9 HE ordnance at existing targets within the CMAGR and would not authorize supersonic flight in the
- 10 existing airspace overlying the CMAGR. There would be no change to the existing training operations at
- 11 the CMAGR and associated airspace. Therefore, implementation of the No-Action Alternative would not
- have a significant impact to public health and safety.

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CHAPTER 4

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2

CUMULATIVE IMPACTS

4.1 CUMULATIVE IMPACTS

- 3 According to CEQ regulations, the analysis of cumulative impacts in an EA should consider the potential
- 4 environmental consequences resulting from "the incremental impacts of the action when added to other
- 5 past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes
- 6 such other actions" (40 CFR § 1508.7). Cumulative impacts can also result from individually minor but
- 7 collectively significant actions taking place over a period of time.

4.2 DEFINITION OF CUMULATIVE IMPACTS

- 8 Cumulative impacts may occur when there is a relationship between a proposed action and other actions
- 9 expected to occur in a similar location and/or during a similar period. This relationship may or may not be
- 10 obvious. Actions overlapping, or in close proximity to, a proposed action can have more potential for
- cumulative impacts on "shared resources" than actions that may be geographically separated. Similarly,
- actions that coincide temporally would tend to offer a higher potential for cumulative impacts.
- 13 To analyze cumulative impacts, a NEPA document must identify a cumulative effects region for impacts
- of a proposed action and other past, present, and reasonably foreseeable actions. In this EA, the USMC has
- 15 identified all actions within and adjacent to the R-2507 airspace. A description of past, present, and
- 16 reasonably foreseeable actions in the cumulative effects region follows. To the extent that details regarding
- 17 such actions exist and the actions have a potential to interact with the Proposed Action described in this
- 18 EA, these actions are included in the cumulative impact analysis.

19 4.2.1 Geographic Scope of the Cumulative Effects Analysis

- 20 For this analysis, a geographic scope, or ROI, was established for each resource area. The ROI is generally
- based on the natural boundaries of the resource affected, rather than jurisdictional boundaries. The
- 22 geographic scope may be different for each resource area. The geographic scope of cumulative effects often
- extends beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of
- 24 the proposed project and alternatives. However, if the Proposed Action is determined to have no direct or
- 25 indirect effects on a resource, no further cumulative effects analysis is necessary. ROIs are defined in
- 26 Section 4.3.2, Potential Cumulative Impacts by Environmental Resource Area for each resource listed
- below. Because ROIs vary for different resources, not all of the projects listed in Table 4-1 would be located
- within the ROIs defined for a particular resource.

4.2.2 Time Frame of the Cumulative Effects Analysis

- 30 A timeframe for each issue related to cumulative effects has been determined. The timeframe is defined as
- 31 the long-term and short-term duration of the effects anticipated. Long-term can be as long as the longest
- lasting effect. Timeframes, like geographic scope, can vary by resource. Each project in a region has its
- 33 own implementation schedule, which may or may not coincide or overlap with the schedule for
- 34 implementing the Proposed Action. This is a consideration for short-term impacts from the Proposed
- 35 Action.

- 1 Past actions are projects that have been approved and/or permitted, and that have either very recently
- 2 completed construction/implementation or have yet to complete construction or implementation. Present
- 3 actions are actions that are ongoing at the time of the analysis. Reasonably foreseeable future actions are
- 4 those for which there are existing decisions, funding, or formal proposals, or which are highly probable
- 5 based on known opportunities or trends; however, these are limited to within the designated geographic
- 6 scope and timeframe. Reasonably foreseeable future actions are not limited to those that are approved or
- 7 funded. However, this analysis does not speculate about future actions that are merely possible but not
- 8 highly probable based on information available at the time of this analysis.
- 9 For this cumulative effects analysis, the timeframe considered for cumulatively-considerable projects
- includes projects recently approved or completed that are not yet addressed as part of the existing conditions
- of the area, projects under construction, and projects that are in the environmental review or planning
- process and for which enough information is available to discern their potential impacts. Projects for which
- 13 no or insufficient information is known, or for which substantial uncertainty exists regarding the project are
- considered speculative and are not evaluated as part of this analysis.

4.3 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

15 4.3.1 Past, Present, And Reasonably Foreseeable Actions

- 16 Cumulative project locations are described in Table 4-1. Also provided in Table 4-1 is a summary of the
- potential impacts by resource area.

18 4.3.2 Potential Cumulative Impacts by Environmental Resource Area

- 19 This section addresses the potential cumulative impacts of the Proposed Action in conjunction with the
- aforementioned cumulative projects. If a project would not result in direct or indirect impacts on a resource,
- 21 no further evaluation from a cumulative impact perspective is warranted. CEQ guidance states, "A
- 22 cumulative effects analysis should 'count what counts,' not produce superficial analyses or a long laundry
- 23 list of issues that have little relevance to the effect of the proposed action or the eventual decisions" (CEO
- 24 1997). Therefore, the cumulative impact analysis focuses on: (1) those resource areas that may be
- significantly impacted by the project, and/or (2) those resource areas currently in poor or declining health
- or at risk even if project impacts would be relatively small. The resources that meet these criteria are:
- 27 airspace and air traffic (Section 3.2), noise (Section 3.3), cultural resources (Section 3.4), biological
- resources (Section 3.5), and public health and safety (Section 3.6).

Table 4-1. Cumulative Projects and Associated Anticipated Impacts

Project Number	Project	Project	Current	Notable Potential	
and Name	Location	Description	Project Status	Project Impacts ¹	
CDFW Big Game Guzzlers	CMAGR	Installation of eight wildlife guzzlers.	Implemented in 2009	Beneficial impacts to bighorn sheep and desert mule deer.	
Chocolate Mountain Solar Farm Extension	Northwest of Niland	Construction of a 49.9- megawatt photovoltaic solar power plant.	Conditional use permit obtained (2013)	Impacts to biological resources.	
SunPeak Solar Park	Northeast of Niland	Construction of a 23- megawatt fixed solar photovoltaic system and substation on a 123-acre (50- hectare) property.	Construction complete (July 2012)	Impacts to biological resources; utilities.	
Infrastructure Improvements at Camp Billy Machen (P-771)	Near Niland	Utility upgrades, construction of instructional spaces, materials handling and material preparation facilities, and berthing.	Finding of No Significant Impact (FONSI) signed in April 2012	Impacts to desert tortoise.	
West Chocolate Mountains Renewable Energy Evaluation	Near Niland	Evaluated the suitability of geothermal and solar energy development within the West Chocolate Mountains Renewable Energy Evaluation Area.	ROD signed (2012)	Impacts to desert tortoise critical habitat.	
Desert Renewable Energy Conservation Plan	Mojave and Colorado deserts, CA	Provide binding, long-term endangered species permit assurances while facilitating review and approval of renewable energy projects.	The BLM signed the ROD approving its Land Use Plan Amendment on September 14, 2016; planning for non-BLM land is ongoing	Impacts to desert tortoise critical habitat and cultural resources.	
CMAGR Geothermal Well Drilling	CMAGR, northwest of Camp Billy Machen	Drill geophysical test holes to investigate hydrothermal potential at three sites.	Project complete (2011)	Impacts to desert tortoise.	

Project Number and Name	Project Location	Project Description	Current Project Status	Notable Potential Project Impacts ¹
CMAGR Land Withdrawal Renewal (entire CMAGR)	CMAGR	BLM withdrawn lands within the CMAGR would continue to be withdrawn and reserved for continued military use, and CMAGR boundary would be realigned to exclude the Bradshaw Trail from the CMAGR.	Final Legislative EIS, published in January 2014. Legislation included in the fiscal year 2014 National Defense Authorization Act	 Military activities would continue to impact desert tortoise and cultural resources. BLM-withdrawn land will be transferred to the Navy; the Navy will manage all CMAGR land per the Sikes Act.²
Proposed R-2507W Restricted Area	Airspace overlying Special Warfare Training Areas (SWATs) 4 and 5	Establishment of Restricted Area in support of aviation and ground training requirements.	FONSI signed June 2014	Impacts to airspace and noise.
Invader Project	R-2507S	New air-to-ground target complex.	FONSI signed	Impacts to desert tortoise.
Communication Towers Project	West and North of SWAT 5 within the CMAGR	Establishment of two radio communication towers.	NEPA not yet started	Given small project footprint and beneficial impact to training safety, negligible impacts anticipated to all resources.
Range Redesign of Special Warfare Training Areas 4 and 5	SWATs 4 and 5 within CMAGR	Reconfigure range training areas, improve range infrastructure, and increase the annual throughput of personnel and training events within SWATs 4 and 5 in the CMAGR.	FONSI signed March 2016	Impacts to biological resources, cultural resources, public health and safety, and noise.

Notes: ¹ See Section 4.3, Past, Present, and Reasonably Foreseeable Actions, for a discussion of which resource areas are analyzed at a cumulative level and why.

² The Sikes Act, as amended (16 USC §§ 670-670f), sets forth specific resource management policies and guidance for U.S. military installations and requires the preparation of Integrated Natural Resources Management Plans (INRMPs) for installations with significant natural resources to provide for the conservation and rehabilitation of natural resources on military installations, which includes military test and training ranges and, where consistent with the military purposes of the installation and otherwise appropriate, the sustainable multipurpose use of those resources.

4.3.3 Cumulative Impacts

- 2 4.3.3.1 Airspace and Air Traffic
- 3 The ROI for airspace consists of the existing R-2507 and the surrounding airspace that supports regional
- 4 military and civilian aviation activities. As presented in the Final Legislative EIS prepared for the CMAGR
- 5 Land Withdrawal Renewal, the development of the National Airspace System in the CMAGR operating
- 6 region began in the 1920s and until the outbreak of World War II was driven principally by the needs of
- 7 civil aviation. Before the close of the war, military airfields had been constructed throughout the region and
- 8 the CMAGR had been established (refer to Figure 3.2-1) (Navy 2013a).
- 9 The close of World War II prompted a sharp reversal in military aviation priorities as most military airfields
- and ranges in the region were closed and most SUA was cancelled. Beginning in 1951, SUA at the CMAGR
- was re-established and ranges were reactivated and have remained in effect ever since. The regional airspace
- 12 system was developed in response to the legitimate needs of both military and civil airspace users. Although
- 13 requirements to modify the airspace system continue to emerge, the overall structure of civil and SUA in
- 14 the CMAGR operating area closely approximated the structure that is currently in effect today (Navy
- 15 2013a).

- The majority of past, present, and reasonably foreseeable future projects in the cumulative effects region
- would involve improvements at or near the ground surface, and therefore would not contribute toward any
- 18 cumulative impact to military or civilian airspace management. None of the alternatives considered in the
- 19 CMAGR Land Withdrawal Renewal EIS would substantially alter the location or function of existing
- airspace in the ROI. The Special Warfare Training Areas (SWATs) 4 and 5 Range Redesign would result
- in an increase of approximately 1,130 annual sorties above SWATs 4 and 5. However, implementation of
- the R-2507W above SWATs 4 and 5 provides SUA to accommodate this increase in sorties and thus avoid
- 23 potential impacts relative to airspace and air traffic. Therefore, no significant cumulative effect would
- 24 occur.
- 25 4.3.3.2 Noise
- 26 The ROI for noise consists of R-2507 and adjacent communities. Several of the cumulatively considerable
- 27 projects are located near noise-sensitive areas potentially affected by the Proposed Action (e.g., the
- 28 Chocolate Mountains Solar Farm Extension, Utility Construction and Maintenance, and SunPeak Solar
- 29 Park). However, these projects would not involve industrial or commercial activities or land uses that would
- 30 introduce new stationary or mobile sources of operational noise. Although ambient noise levels at
- 31 noise-sensitive areas may temporarily increase during the construction of these projects, such impacts
- would be short-term and would likely be minimized through application of avoidance/minimization
- measures (e.g., scheduling construction to avoid night or early morning hours) that would be identified in
- 34 required environmental documentation (i.e., NEPA and/or the California Environmental Quality Act
- 35 analyses).
- 36 One past project, the establishment of R-2507W, increased the aircraft-generated noise environment. The
- 37 cumulative increase in sorties resulting from the establishment of R-2507W in conjunction with the
- 38 Proposed Action would not result in a noticeable change to the noise environment at noise-sensitive areas,
- 39 because the noise impacts from the R-2507W project (NAVFAC SW 2014) were far below established
- 40 noise impact thresholds and as demonstrated by the Proposed Action herein, there would be a negligible
- impact to the noise environment. As discussed in Section 3.3, *Noise*, the Proposed Action's noise impacts

- *I* would involve a relatively minor contribution toward a less than significant cumulative effect. Therefore,
- 2 no significant cumulative effect would occur.
- 3 4.3.3.3 Cultural Resources
- 4 The ROI for the cumulative analysis of cultural resources is the CMAGR. Prehistoric sites and historic-
- 5 period built environment resources both individually and when evaluated together provide an important
- 6 window into the past, particularly when these resources are found in the same setting and context in which
- 7 they originated. These resources and their original settings also represent places of traditional importance
- 8 to Indian Tribes. The CMAGR is a major land unit in a greater area east of the Coachella Canal that
- 9 comprises the largest relatively undisturbed tract of the Sonoran Desert in California (Navy 2013a).
- 10 Military training activities that directly affect the CMAGR land surface are clearly defined and localized to
- specific areas. These activities would not be affected by the Proposed Action. After approximately 70 years
- of military use, the majority of the CMAGR retains its original natural desert setting and exhibit ground
- 13 surfaces that are largely undisturbed. Further, the need to protect public safety from hazards associated with
- 14 live-fire training, UXO, and other military activities, and to prevent interruption of training schedules, has
- required that the CMAGR be closed to public access. These conditions, which are incidental consequences
- of the range and range training, do not guarantee protection of cultural resources; nevertheless, they benefit
- 17 the preservation of prehistoric sites, historic-period built environment resources, and the context and
- settings in which they originated (Navy 2013a).
- All cumulative projects having a potential to impact cultural resources either have gone, or will undergo,
- 20 Section 106 review by the SHPO and impacts would be mitigated as required. Mitigation measures may
- 21 include monitoring, excavation, or other measures designed to minimize impacts to cultural resources.
- While individual projects as well as day-to-day management of cultural resources by MCAS Yuma would
- continue to minimize the potential for impacts to cultural resources, the potential deterioration of cultural
- 24 resources due to past and present and reasonably-foreseeable projects (e.g., on-going training, future
- undertakings, and/or public vandalism) would occur. However, the level of cumulative impact is not
- anticipated to be significant given the active management, dispersed nature of training and projects, and the
- 27 relative isolation of the ROI. Therefore, the Proposed Action is not anticipated to contribute to a cumulative
- 28 impact to cultural resources.
- 29 4.3.3.4 Biological Resources
- 30 This cumulative analysis focuses on the desert tortoise, the only biological resource with any potential for
- 31 significant cumulative effect. The ROI for the cumulative analysis of the desert tortoise is the Colorado
- 32 Desert Recovery Unit of the Agassiz's desert tortoise (formerly known as the Mojave population of the
- 33 desert tortoise).
- 34 The vast majority of threats to the desert tortoise or its habitat are associated with human land uses. Since
- 35 the 1800s, portions of the desert southwest occupied by desert tortoises have been subject to a variety of
- 36 impacts that cause habitat loss, fragmentation, and degradation, thereby threatening the long-term survival
- of the species (USFWS 2010). Areas within the ROI that have not been developed have experienced a lesser
- degree of disturbance and contain a higher percentage of native habitat, and thus present a higher biological
- value to desert tortoises in terms of forage/protective cover and nesting habitat, as compared to developed
- 40 areas.
- The Desert Renewable Energy Conservation Plan and West Chocolate Mountains Renewable Energy EIS
- 42 are planning, non-development projects. As such, neither project would contribute to a regional impact on
- 43 special-status species. However, as discussed above, the Desert Renewable Energy Conservation Plan

- would provide data on all desert projects potentially affecting biological resources. Similarly, the West
- 2 Chocolate Mountains Renewable Energy EIS identifies potential sites that minimize or avoid potential
- 3 impacts to biological resources (BLM 2012). Thus, the EIS will narrow analysis for future projects, while
- 4 project proponents would be required to evaluate and mitigate for environmental impacts at the time they
- 5 seek authorization to pursue electricity generation.
- 6 The Invader EA and Range Redesign of Special Warfare Training Areas 4 and 5 EA projects both included
- 7 USFWS consultation that resulted in BOs that included measures to reduce and/or mitigate the potential for
- 8 impacts to the desert tortoise. While solar power projects can be a point of concern for biological resources,
- 9 the SunPeak Solar Park and Chocolate Mountain Solar Farm Extension are located outside of designated
- critical habitat for the desert tortoise.
- 11 As a result of the legislation included in the fiscal year 2014 National Defense Authorization Act for the
- 12 CMAGR land transfer, the Navy was made responsible for managing natural and cultural resources and
- 13 preparing an Integrated Natural Resources Management Plan (INRMP) at the CMAGR. The INRMP was
- finalized February 2017 (MCAS Yuma 2017). Management has been delegated to the Marine Corps, which
- vill act locally through the Commanding Officer, MCAS Yuma. The CMAGR INRMP provides an
- integrated, comprehensive plan for managing the natural resources of the CMAGR and for managing
- 17 sustainable public use of those resources to the extent that such management and use is consistent with the
- military purposes of the range. Natural resources and military use are being managed so that there is no net
- loss in the capability of the CMAGR to support its military purposes and in a manner that is consistent with
- 20 ecosystem management principles. Furthermore, management prescribed by the INRMP benefits
- 21 threatened and endangered species on the CMAGR, including the desert tortoise, consistent with federal
- and state recovery actions for these species under the ESA.
- The Proposed Action is not anticipated to contribute to cumulative impacts on special-status species.
- 24 Furthermore, the implementation of the revised desert tortoise recovery plan will resolve key uncertainties
- about threats and management, thereby improving recovery potential throughout the region (USFWS 2011).
- 26 In addition, through the implementation of the management actions that are prescribed in the CMAGR
- 27 INRMP, the desert tortoise as well as other natural resources would benefit. Therefore, the Proposed Action
- is not anticipated to contribute to a cumulative impact to biological resources.
- 29 4.3.3.5 Public Health and Safety
- The ROI for public health and safety includes those identified cumulative projects within the CMAGR.
- 31 Military training within the ROI often involves activities that are inherently hazardous to non-participating
- 32 personnel, vehicles, or aircraft. Military ranges, including the CMAGR, and restricted airspace are designed
- to protect the safety of the public and military personnel alike by restricting non-participants from training
- 34 areas and airspace where hazardous activities are occurring and by conducting live-fire weapons use in
- accordance with DoD standards that there be a 99.9999 percent probability of containing all munitions or
- munitions fragments within the range and airspace boundaries (Navy 2013a). Surface danger zones would
- 37 continue to be contained within the CMAGR under cumulative project conditions.
- Past, present, and reasonably foreseeable projects would increase ordnance and munitions use, collectively
- increasing the likelihood of UXO migration off the CMAGR; however, the risk would remain low, as no
- 40 off-CMAGR UXO migration has been identified. MCAS Yuma would continue to conduct UXO sweeps
- on a quarterly basis to clear UXO to the extent safe and practicable. Cumulative increases in
- 42 munitions/ordnance use would also result in the increased deposition of MCs and chemical residues
- throughout the CMAGR. However, those increases are not likely to elevate public health and safety
- 44 concerns because pathways to human receptors have not been identified. While the MCAS Yuma REVA

(MCAS Yuma 2015) did not identify any imminent MC-related risk to persons or the environment, on going sampling and analysis will continue through the REVA process, which is conducted every 5 years.

Past, present, and reasonably foreseeable future actions would not directly cause additive or interactive effects that would expose either non-participating or military personnel to increased risks associated with military activities. For example, establishment of the R-2507W SUA (NAVFAC SW 2014) resulted in a beneficial impact to safety, as the potential for non-participating (i.e., civilian and commercial) aircraft to enter airspace above SWATs 4 and 5 during training would be reduced. In addition, none of the identified past, present, and reasonably foreseeable future actions would have an additive effect that would somehow increase the frequency of unauthorized entry to the CMAGR. Rather, the minor changes in the CMAGR boundary associated with the Legislative EIS (Navy 2013a) would reduce the risk of unauthorized and unintentional trespass by establishing well defined and visually prominent boundary alignments, to reduce public misunderstanding as to the presence or location of the CMAGR. Furthermore, range training area improvements associated with SWATs 4 and 5 included the placement of hundreds of notification signs and the construction of fencing to help reduce the amount of trespassing. Therefore, the Proposed Action is not anticipated to contribute to a cumulative impact to public health and safety.

1 CHAPTER 5

2 OTHER CONSIDERATIONS REQUIRED BY NEPA

5.1 Possible Conflicts between the Proposed Action and the Objectives of Federal, State, Local, and Regional Land Use Plans, Policies, and Controls

- 3 Implementation of the Proposed Action would comply with all applicable federal, state, and local statutes
- 4 and regulations (refer to Section 1.6, *Regulatory Setting*), as well as all applicable federal, state, regional,
- 5 and local policies and programs.
 - 5.2 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL OF ALTERNATIVES INCLUDING THE PROPOSED ACTION AND ALL MITIGATION MEASURES BEING CONSIDERED
- 6 The Proposed Action use of HE ordnance does not reflect any construction need or change in maintenance
- 7 needs. Thus, the energy requirements are unchanged from current conditions.

5.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF NATURAL OR FINITE RESOURCES

- 8 Resources that are irreversibly or irretrievably committed to a project are those used on a long-term or
- 9 permanent basis. This includes the use of non-renewable resources such as metal and fuel, and other natural
- 10 or cultural resources. These resources are "irretrievable" when used for one project when another action
- could have used them for another purpose. Human labor is also an irretrievable resource. Another impact
- that falls under this category is the unavoidable destruction of natural resources that could limit the range
- of potential uses of that particular environment. No construction is included under the Proposed Action,
- and thus implementation would not constitute a significant irreversible or irretrievable commitment of
- 15 resources.

5.4 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF THE HUMAN ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM NATURAL RESOURCE PRODUCTIVITY_____

- NEPA requires an analysis of the relationship between a project's short-term impacts on the environment
- and the effects that these impacts may have on the maintenance and enhancement of the long-term
- 18 productivity of the affected environment. Impacts that narrow the range of beneficial uses of the
- environment are of particular concern. This refers to the possibility that choosing one development option
- 20 reduces future flexibility in pursuing other options, or that designate a parcel of land or other resource to a
- certain use often eliminates the possibility of other uses at that site.
- 22 The Proposed Action would result in long-term effects primarily related to the elimination of schedule
- 23 restrictions on HE ordnance use and the restrictions on supersonic flight within the CMAGR. However, the
- 24 Proposed Action would not result in any impacts that would reduce environmental productivity,

- 1 permanently narrow the range of beneficial uses of the environment, or pose long-term risks to health,
- 2 safety, or the welfare of the public.

5.5 MEANS TO MITIGATE AND/OR MONITOR ADVERSE ENVIRONMENTAL IMPACTS _

- 3 No measures have been identified to mitigate and/or monitor adverse environmental impacts as none are
- 4 anticipated.

1 CHAPTER 6

2 REFERENCES

- 3 Battis, J.C. 1983. Seismo-Acoustic Effects of Sonic Booms on Archaeological Sites, Valentine Military
- 4 Operations Area. Air Force Geophysical Laboratory. Report AFGL-TR-83-0304. Battis, J.C. 1988.
- 5 The Effect of Low Flying Aircraft on Archaeological Sites, Kayenta, Arizona. Air Force
- 6 Geotechnical Laboratory. Technical Memorandum No. 146.
- 7 Blauert, J. 1997. Spatial Hearing. The Psychophysics of Human Sound Localization, Revised Edition.
- 8 BLM. 2009. Environmental Assessment for Eight Wildlife Guzzlers for the CMAGR. California Desert District, El Centro Field Office.
- BLM. 2012. Final Environmental Impact Statement and Proposed California Desert Conservation Area Plan Amendment for the West Chocolate Mountains Renewable Energy Evaluation Area. November.
- Bowles, A.E., S. Eckert, L. Starke, E. Berg, L. Wolski, and J. Matesic, Jr. 1999. Effects of flight noise
- from jet aircraft and sonic booms on hearing, behavior, heart rate, and oxygen consumption of desert
- tortoise (Gopherus agassizii). Sea World Research Institute, Hubbs Marine Research Center, San
- Diego, CA. 131 pages.
- California Department of Parks and Recreation. 2018. San Pasqual Battlefield State Historic Park.
- Accessed on January 17, 2018 at https://www.parks.ca.gov/?page_id=655.
- California OHP. 2014. Letter to MCAS Yuma regarding the undetermined eligibility of the berms adjacent to Coachella Canal. 3 April.
- California OHP. 2018a. National Historic Landmarks Located in Imperial County, California. Accessed on 17 January 2018. http://ohp.parks.ca.gov/?page_id=21421.
- California OHP. 2018b. National Historic Landmarks Located in Riverside County, California. Accessed on 17 January 2018. http://ohp.parks.ca.gov/?page_id=21452.
- California OHP. 2018c. Listed California Historic Resources in Imperial County, California. Accessed on 17 January 2018. http://ohp.parks.ca.gov/ListedResources/?view=county&criteria=13.
- California OHP. 2018d. Listed California Historic Resources in Riverside County, California. Accessed on 17 January 2018. http://ohp.parks.ca.gov/ListedResources/?view=county&criteria=33.
- 28 CDFW. 2018a. RareFind 5. Data query available via subscription. Available at:
- 29 https://www.wildlife.ca.gov/data/cnddb/maps-and-data. Accessed on 12 April 2018.
- 30 CDFW. 2018b. Natural Diversity Database. Special Animals List. Periodic publication. April. Available at: http://www.dfg.ca.gov/wildlife/nongame/list.html. Accessed on 12 April 2018.
- 32 CEQ. 1997. Considering Cumulative Effects Under the National Environmental Policy Act. January.
- Ellis, D.H., C.H. Ellis, and D.P. Mindell. 1991. Raptor Responses to Low-Level Jet Aircraft and Sonic Booms. Environmental Pollution Vol. 74 pgs. 53-83.
- FAA. 2012. JO 7400.2J, Change 1, Procedures for Handling Airspace Matters. 26 July.
- 36 Ghost Towns. 2018a. Ghost Towns of California-Imperial County. Accessed on 17 January 2018 at
- 37 http://www.ghosttowns.com/states/ca/caimperial.html.

- 1 Ghost Towns. 2018b. Ghost Towns of California- Riverside County. Accessed on 17 January 2018 at
- 2 http://www.ghosttowns.com/states/ca/cariverside.html.
- 3 Haber, J. and D. Nakaki. 1989. Sonic Boom Damage to Conventional Structures. HSD-TR-89. April.
- 4 Hershey, R.L. and T.H. Higgins. 1976. Statistical Model of Sonic Boom Damage. ADA 028512. July.
- 5 Larkin, R.P. 1996. Effects of military noise on wildlife: a literature review. Illinois Natural History
- 6 Survey, Center for Wildlife Ecology.
- 7 MCAS Yuma. 2013. Station Order 3710.6J. MCAS Yuma Range and Training Areas Standard Operating
- 8 Procedures. 30 January.
- 9 MCAS Yuma. 2015. Range Environmental Vulnerability Assessment. Five Year Review. August.
- MCAS Yuma. 2017. Integrated Natural Resources Management Plan for the Chocolate Mountain Aerial Gunnery Range, California. February.
- MCAS Yuma. 2018. Comment from Bobby Law. Comment Response Matrix for Post-2200 (10:00 P.M.)
- High Explosive Ordnance Expenditure and Supersonic Flights EA, Preliminary Draft v.1.
- McCracken, G.F., Gillam, E.H., Westbrook, J.K., Lee, Y.F., Jensen, M.L. and Balsley, B.B., 2008.
- 15 Brazilian free-tailed bats (*Tadarida brasiliensis*: Molossidae, Chiroptera) at high altitude: links to
- migratory insect populations. Integrative and Comparative Biology, 48(1), pp. 107-118.
- Mills, AW. 1960. Lateralization of high-frequency tones. Journal of the Acoustical Society of America 32: 132–134.
- Murphy RW, Berry KH, Edwards T, Leviton AE, Lathrop A, and Riedle JD. 2011. The dazed and
- 20 confused identity of Agassiz's land tortoise, *Gopherus agassizii* (Testudines, Testudinidae) with the
- description of a new species, and its consequences for conservation. ZooKeys 113: 39–71. doi:
- 22 10.3897/zookeys.113.1353.
- Nagy, K.A., and P.A. Medica. 1986. Physiological ecology of desert tortoises in southern Nevada.
- 24 Herpetologica 42: pp. 73-92.
- 25 NASA. 2017. NASA Armstrong Fact Sheet: Sonic Booms.
- 26 https://www.nasa.gov/centers/armstrong/news/FactSheets/FS-016-DFRC.html. 14 August. Accessed
- 27 on 28 February 2018.
- 28 NAVFAC SW. 2013. Final Focused Survey and Habitat Assessment for Agassiz's Desert Tortoise on
- 29 SWATs 4 and 5, CMAGR, Riverside and Imperial Counties, CA. Prepared by Circle Mountain
- 30 Biological Consultants. February.
- 31 NAVFAC SW. 2014. Final Environmental Assessment and Finding of No Significant Impact for
- 32 Proposed Establishment of Special Use Airspace Restricted Area R-2507W, Chocolate Mountain
- 33 Aerial Gunnery Range, Imperial and Riverside Counties, CA. July.
- 34 NAVFAC SW. 2017a. Scope of Work, Contract N62470-16-D-9002. Revised 17 July.
- 35 NAVFAC SW. 2017b. Geographic Information Systems (GIS) data.
- 36 NAVFAC SW. 2018. Noise Analysis, Post-2200 High Explosive Ordnance Expenditure and Supersonic
- 37 Flights. February.
- Navy. 2013a. Final Legislative EIS for the Renewal of the CMAGR Land Withdrawal. April.
- 39 Navy. 2013b. Final Report Cultural Resource Survey Special Warfare Training Areas 4 and 5, Chocolate
- 40 Mountain Aerial Gunnery Range, Imperial and Riverside Counties, California. October.

- 1 National Park Service. 2015. National Register of Historic Places Program: Research Data Downloads
- 2 Spatial Data (GIS). Listings were current from federal agencies up to July 2015.
- 3 National Park Service. 2018. Map of the California National Historic Trail.
- 4 Schaefer, J., and M. Dalope. 2011. Results of a Class III Cultural Resources Survey to Support the P-771
- 5 Facility Improvements and Material Storage Facility at Navy Seals Camp Billy Machen, Chocolate
- 6 Mountain Aerial Gunnery Range, Imperial County, California. Prepared for NAVFAC SW. Prepared
- 7 by ASM Affiliates. July.
- 8 Schaefer, J., S. Ní Ghabhláin, and M. Becker. 2003. A Class III Cultural Resource Inventory and
- 9 Evaluation for the Coachella Canal Lining Project: Prehistoric and Historic Sites along the
- Northeastern Shore of Ancient Lake Cahuilla, Imperial and Riverside Counties, California. ASM
- Affiliates, Inc. Submitted to Coachella Valley Water District and USDI Bureau of Reclamation.
- 12 Sutherland, L.C. 1989. Assessment of Potential Structural Damage from Low Altitude Subsonic Aircraft.
- 13 Wyle Labs. WR 89-16.
- 14 U.S. Air Force. 2008. F-35 Force Development Evaluation and Weapons School Beddown Draft
- Environmental Impact Statement. March.
- 16 U.S. Bureau of Transportation Statistics. 2012. GIS Data http://www.rita.dot.gov/bts/.
- 17 U.S. Environmental Protection Agency. 1992. Procedures of Emissions Inventory Preparation. Volume
- 18 IV; Mobile Sources. December.
- 19 USFWS. 1990. Endangered and threatened wildlife and plants: determination of threatened status for the
- Mojave population of the desert tortoise. Federal Register 55: 12178–12191.
- 21 USFWS, 1994. Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the
- 22 Mojave Population of the Desert Tortoise; Final Rule. Federal Register 59:5820-5866.
- 23 USFWS. 1996. BO for the Military Use of the CMAGR, CA (1-6-96-F-40). 18 April.
- 24 USFWS. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the U.S.
- 25 Biological Technical Publication. BTP-R6001-2003.
- 26 USFWS. 2010. Mojave Population of the Desert Tortoise (Gopherus agassizii), 5-Year Review: Summary
- and Evaluation. Desert Tortoise Recovery Office. Reno, Nevada. 30 September.
- 28 USFWS. 2011. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (Gopherus
- *agassizii*). Region 8, Pacific Southwest Region, Sacramento, CA.
- 30 USFWS. 2012. Range-wide Monitoring of the Mojave Desert Tortoise (Gopherus agassizii): 2012
- Annual Report. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno,
- 32 Nevada.
- USFWS. 2015. Range-wide Monitoring of the Mojave Desert Tortoise (Gopherus agassizii): 2013 and
- 2014 Annual Reports. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service,
- 35 Reno, Nevada.
- 36 USFWS. 2017. U.S. FWS Threatened & Endangered Species Active Critical Habitat Report. Desert
- Tortoise Critical Habitat. Available at: https://ecos.fws.gov/ecp/report/table/critical-habitat.html
- 38 U.S. Geological Survey. 2016. Desert Tortoise Ecology, Mojave Desert Tortoise GATF Project.
- 39 Available at: https://geochange.er.usgs.gov/sw/impacts/biology/tortoise1/. Accessed on 11 April
- 40 2018.

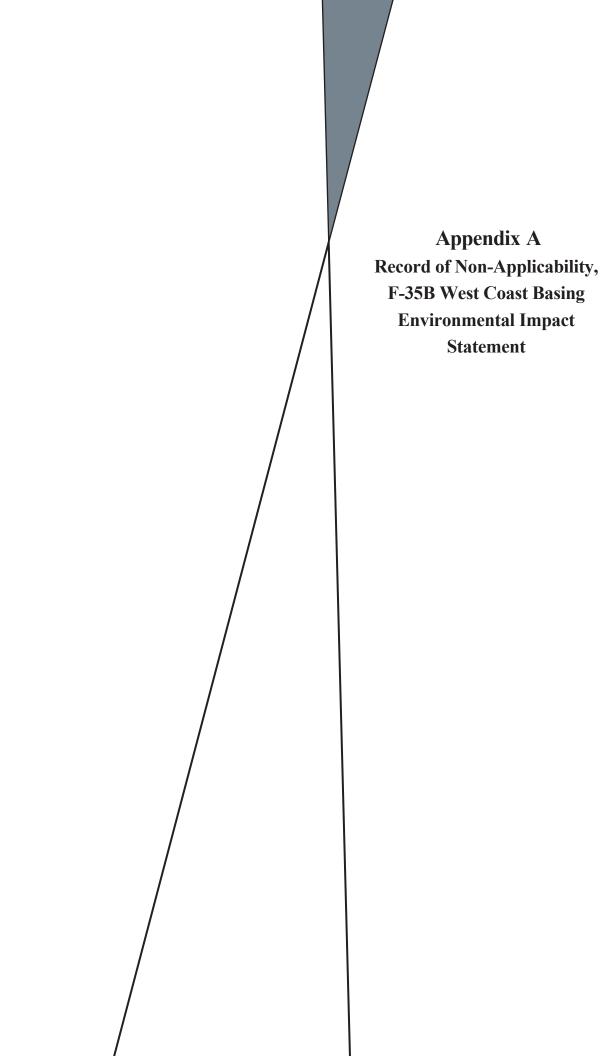
- 1 USMC. 2010. USMC F-35B West Coast Basing Final EIS. October.
- 2 USMC. 2012. Environmental Assessment for P-771 Proposed Infrastructure Improvements, Camp Billy
- 3 Machen, CA. April.
- Woodman, A. P. 2008. Desert Tortoise Surveys for SWATs 4 and 5 on the CMAGR, California. Prepared
- for Ecology and Environment, Inc. on behalf of NAVFAC SW and MCAS Yuma, U.S. Navy
- 6 Contract No. N68711-01-D-6205. Ridgecrest, CA.
- Workman, G.W., T.D. Bunch, J.W. Call, R.C. Evans, L.S. Neilson, and E.M. Rawlings. 1992. Sonic
- 8 Boom/Animal Disturbance Studies on Pronghorn Antelope, Rocky Mountain Elk, and Bighorn
- 9 Sheep. Utah State University Foundation: Logan. Prepared for USAF, Hill AFB, UT.

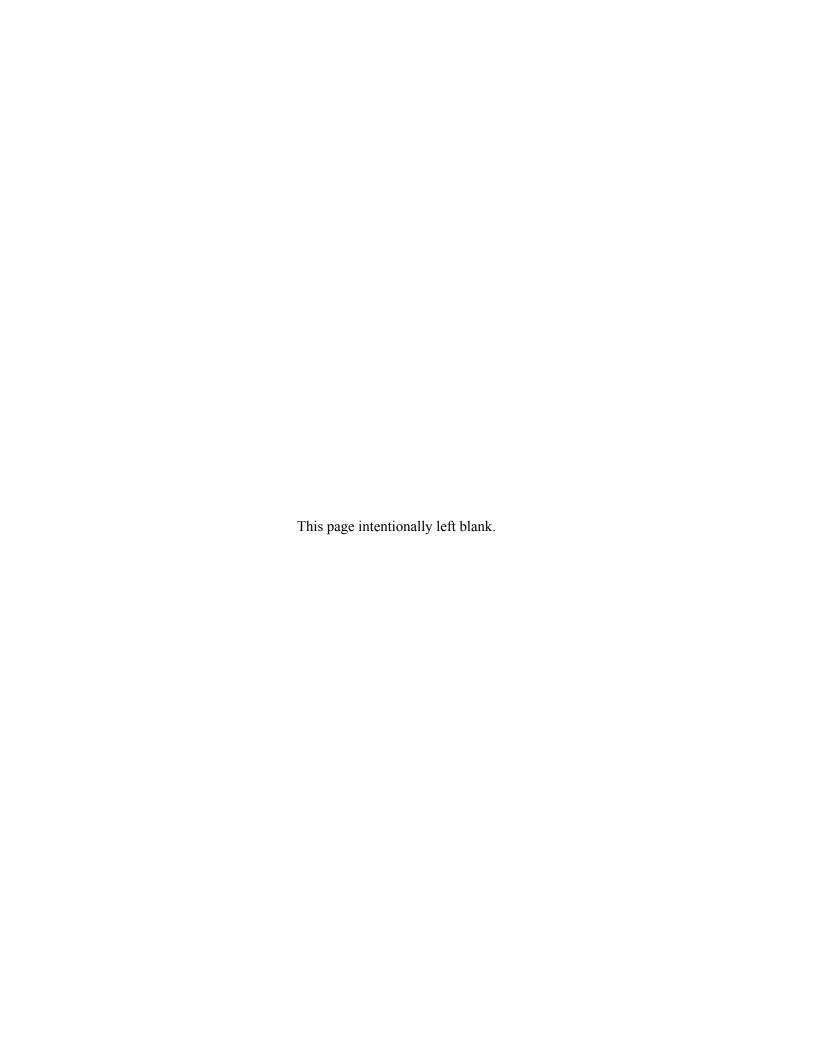
1 CHAPTER 7

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FOR CLEAN AIR ACT CONFORMITY F-35B West Coast Basing

MCAS Miramar, California and MCAS Yuma, Arizona

INTRODUCTION

The United States (U.S.) Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule,* in the 30 November 1993, *Federal Register* (40 Code of Federal Regulations [CFR] Parts 6, 51, and 93). The USEPA published *Revisions to the General Conformity Regulations* in the 5 April 2010 Federal Register (040 CFR Parts 51 and 93). The U.S. Marine Corps (Marine Corps) policy for complying with the General Conformity Rule and Regulations is contained in MCO P5090.2 "Environmental Compliance and Protection Manual." The U.S. Navy published *Interim Guidance on Compliance with the Clean Air Act General Conformity Rule* in Appendix F, OPNAVINST 5090.1C, dated 30 October 2007. These publications provide implementing guidance to document compliance with the Clean Air Act (CAA) General Conformity Rule regulatory requirements.

Federal regulations state that no department, agency, or instrumentality of the federal government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the federal agency to determine whether a federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 93.154).

Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels for National Ambient Air Quality Standards (NAAQS) for criteria pollutants (40 CFR Part 93.153). *De minimis* levels (in tons/year) for the air basins potentially affected by the Proposed Action are listed in Table 1.

Table 1. De Minimis Levels for NAAQS Criteria Pollutants				
Criteria Pollutant	De Minimis Level (tons/year)			
San Diego Air Basin				
CO	100			
NO _x	100			
VOC	100			
Yuma County				
Particulate Matter with an Aerodynamic Diameter of 10 microns or less (PM ₁₀)	100			
Riverside County				
Particulate Matter with an Aerodynamic Diameter of 10 microns or less (PM ₁₀)	70			
NO_x	25			
VOC	25			
Imperial County				
Particulate Matter with an Aerodynamic Diameter of 10 microns or less (PM ₁₀)	70			
NO _x	100			
VOC	100			

The San Diego County Air Pollution District (SDCAPD) Rule 1501 implements the USEPA's General Conformity Rule. Within the San Diego Air Basin (SDAB) that includes Marine Corps Air Station (MCAS) Miramar, if net annual emissions of volatile organic compounds (VOCs), carbon monoxide (CO), or nitrogen oxide (NO $_x$) increase by less than 100 tons each, a CAA conformity determination is not required. For Yuma County, which includes MCAS Yuma, part of the Barry M. Goldwater Range West and the proposed Auxiliary Landing Field (ALF), if net annual emissions of PM $_{10}$ increase by less than 100 tons, a conformity determination is not required. Use of airspace and ranges would affect Riverside and Imperial counties in California. In Riverside County, nets increases in emissions must not exceed 70 tons for PM $_{10}$, 25 tons for NO $_x$, or 25 tons for VOCs or a conformity determination would be required. For Imperial County, no conformity determination would be required as long as net increases in emissions do not match or exceed 70 tons for PM $_{10}$ or 100 for NO $_x$ or VOCs.

PROPOSED ACTION

<u>Action Proponent:</u> Department of the Navy

Locations: MCAS Yuma, Arizona, and MCAS Miramar, California

Date RONA Prepared: August 1, 2010

Proposed Action Name: Marine Corps F-35B West Coast Basing

Proposed Action Summary: The Proposed Action is to: 1) base six operational F-35B squadrons at MCAS Miramar, and five operational squadrons and one Operational Training and Evaluation (OT&E) squadron at MCAS Yuma to replace the F/A-18 and AV-8B legacy aircraft; 2) construct and/or modify airfield facilities and infrastructure, between the years 2011 and 2017, to accommodate the F-35B squadrons; 3) and conduct F-35B training operations in existing airspace and on existing ranges, beginning in 2012.

<u>Air Emissions Summary</u>: Emissions associated with the Proposed Action would include temporary emissions from the construction of facilities, aircraft emissions from training operations at airfields and training ranges once the aircraft is based. The analyses includes operational emissions from both aircraft and ground vehicles. Tables 2, 3, and 4 present an estimation of the net change in annual conformity-related emissions generated by the Proposed Action within each nonattainment area.

Construction

Construction activities at the two bases would result in air quality impacts from: 1) combustion emissions due to the use of fossil fuel-powered equipment; and 2) fugitive dust emissions (PM_{10}) during demolition activities, earth-moving activities, and the operation of equipment on bare soil.

Air quality impacts from construction of the ALF in the western portion of the Barry M. Goldwater Range West would result from: 1) combustion emissions due to the use of fossil fuel-powered equipment; and

2) fugitive dust emissions (PM_{10}) during earth-moving activities and the operation of equipment on bare soil. Construction of the ALF would occur in three phases between 2012 and 2016.

For all locations, fugitive dust emissions were calculated from the total site disturbance projected for each construction project for all construction years. Equipment usage was based on prior analyses for construction projects to estimate project combustion and fugitive dust emissions (Marine Corps 2009). A conservative estimate of 30 days of grading was used.

Table 2 summarizes the annual and total construction emissions associated with the Proposed Action at MCAS Miramar, MCAS Yuma, and the ALF. These data show that no emissions for proposed construction activities would exceed the conformity *de minimis* thresholds. The MCAS Yuma project region is in attainment for O₃, CO, NO₂, SO₂, and PM_{2.5} and the nominal construction emissions of these criteria pollutants and their precursors are only a small fraction (maximum of 0.6 percent) of their conformity *de minimis* levels in a nonattainment area (100 tons per year). Neither separately nor combined would construction at MCAS Yuma or the proposed ALF generate PM₁₀ emissions that would exceed the *de minimis* threshold. SDAB is in attainment of all NAAQS for all pollutants except O₃. Within the SDAB, western San Diego County is in maintenance for CO. As the data in Table 2 demonstrate, no O₃ precursors or CO emission would attain more than 50 percent of the conformity *de minimis* levels in any year and most years would not exceed 10 percent.

Table 2. Annual Emissions Due to Construction for the Proposed Action						
	MCA	S Miramar	(SDAB)			
Construction Year		Α	ir Pollutant E	missions (t	ons)	
Construction Year	СО	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
2014	7.74	6.52	1.06	0.02	4.58	1.26
2015	33.4	49.32	6.76	0.09	7.80	2.54
2016	11.39	15.95	2.22	0.03	3.96	1.45
2017	5.48	3.23	0.59	0.01	8.31	1.90
Conformity <i>De Minimis</i> Level	100	100	100	N/A	N/A	N/A
	MCAS 1	Yuma (Yum	a County)			
Construction Year		Α	ir Pollutant E	missions (t	ons)	
Construction real	СО	NO_x	VOC	SO _x	PM ₁₀	PM _{2.5}
2011	15.40	16.70	2.83	0.02	8.15	2.53
2012	41.03	34.55	5.87	0.06	22.90	6.44
2013	4.76	7.27	1.22	0.00	1.45	0.66
2014	3.06	4.69	0.76	0.00	0.70	0.36
2015	22.08	18.31	2.98	0.05	13.74	3.71
2016	12.72	9.03	1.55	0.03	11.13	2.75
Conformity <i>De Minimis</i> Level	N/A	N/A	N/A	N/A	100	N/A
ALF at Barr	ry M. Gold	water Ran	ge West (Yu	ma County,)	
Construction Year		Α	ir Pollutant E	missions (t	ons)	
Construction real	СО	NO_x	VOC	SO _x	PM ₁₀	PM _{2.5}
2012	11.19	3.40	0.94	0.02	10.17	2.36
2014	8.87	2.88	0.76	0.02	8.67	2.01
2016	6.86	2.41	0.62	0.01	7.53	1.74
Conformity <i>De Minimis</i> Level	N/A	N/A	N/A	N/A	100	N/A

The main sources of $PM_{10}/PM_{2.5}$ emissions in these regions would occur as fugitive dust from earth-moving and demolition activities.

Discussion of combined construction and operational emissions is presented below. No combined emission would exceed any *de minimis* thresholds.

Operations

Operational emissions associated with the Proposed Action would include emissions associated with aircraft operations and ground/tactical support equipment operations. These emissions are based on conditions in 2023, when the aircraft transition would be complete. That is, all F/A-18s and AV-8Bs would be replaced by F-35Bs. Air quality impacts associated with the basing of F-35B aircraft were assessed by evaluating the net increase in emissions associated with F-35B operations within the MCAS Yuma region, MCAS Miramar region, and in training airspace. Emissions also would be associated with operational use of the new ALF in the Barry M. Goldwater Range. Existing and proposed sources would be limited to aircraft operations and to increases in vehicle traffic to the ALF to maintain the ALF and perform ground functions for F-35B training at the ALF. It was assumed that the Proposed Action would result in no increase in use of stationary sources.

Operational data used to calculate emissions from F-35B operations were obtained from the Joint Strike Fighter Program Office in charge of design and development of the F-35. Engine time-in-modes, taxi time, and approach and departure parameters from the test F-35 aircraft were used to estimate emissions. Because the F-35B engine is still in the developmental stage and no operational data are available, the analysis used the best available data from the test engine (F-135), as provided by the Joint Strike Fighter Program Office. Emission indices were derived for the Marine Corps Air Facility Quantico and Naval Air Station Patuxent River F-35B basing environmental analyses (Luker 2009). For those analyses, Karnes2 flight profiles were used to identify engine fuel flow rates, engine power setting, airspeed, altitude, and times in mode for each mode of operation in the profile.

Operational activity from aircraft associated with the proposed operations would emit minimal amounts of toxic air contaminants (TACs). The main sources of TACs are mostly mobile and intermittent in nature and therefore, would produce minimal impacts to air quality in a localized area. TACs generally are subsets of VOCs and PM₁₀ emissions, both of which would decrease from baseline levels. Therefore, TACs would decrease from baseline levels.

The data in Table 3 demonstrate that replacement of the current F/A-18 and AV-8B operations at MCAS Miramar and MCAS Yuma with proposed operations would reduce annual emissions for all criteria pollutants except SO_2 . The MCAS Yuma region is in attainment for SO_2 and the nominal increase in proposed operational emissions of these criteria pollutants are only a small fraction (0.75 percent) of the USEPA's estimated SO_2 emissions for the year 2002 for Yuma County (USEPA 2010). Air quality impacts associated with these emissions would be minimal.

Since the bulk of construction activity at MCAS Miramar would precede completion of aircraft basing and maximum operations at the air station, the combined emissions of construction and operations would not exceed *de minimis* for any criteria pollutant. Construction and operations would overlap during 2017 only. Based on the changes to emission from the complete transition of aircraft, the partial transition occurring in 2017 would result in net decreases from existing conditions for CO, NO_x, and VOCs. In that same year, construction emission would represent less than 1 percent to about 6 percent of the conformity *de minimis* levels. Combined, the operational and construction emission would remain well below *de minimis* levels.

The bulk of construction at MCAS Yuma would occur in 2012 and diminish thereafter. The combined emissions of construction and operations in 2012 would not exceed conformity *de minimis* levels of PM_{10} in Yuma County. Overall, by 2023, the transition to operations by the F-35B would result in a decrease of 67.97 tons per year in PM_{10} emissions. Given that the transition could be about one-third completed by the end of 2012, a proportional decrease in PM_{10} emission may be anticipated. With construction emissions of only about 23 tons of PM_{10} in 2012, the net change in combined emissions for PM_{10} would not near *de minimis* thresholds.

Table 3. Annual Emissions Due to Operational Activity for the Proposed Action at MCAS Miramar and MCAS Yuma						
N	ACAS Mira	mar (SDAB)	1			
Activity		Α	ir Pollutant E	missions (t	ons)	
Activity	СО	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
Annual Proposed Emissions	121.56	391.32	20.21	37.10	22.87	16.69
Existing Conditions	1,748.60	446.45	593.48	13.43	234.36	223.39
Net Change from Existing Conditions	-1,627.04	-55.13	-573.27	23.67	-211.49	-206.70
Conformity <i>De Minimis</i> Level	100	100	100	N/A	N/A	N/A
2020 SDAB Emission Estimates, tons per year	203,634	35,587	49,823	876	46,538	12,155
Mo	CAS Yuma (Yuma Cour	nty)			
Activity		Α	ir Pollutant E	missions (t	ons)	
Activity	СО	NO_x	VOC	SO _x	PM ₁₀	PM _{2.5}
Annual Proposed Emissions	154.33	361.06	21.43	33.10	7.01	6.57
Existing Conditions	572.59	257.19	92.85	4.57	74.98	73.5
Net Change from Existing Conditions	-418.26	103.87	-71.42	28.53	-67.97	-66.93
Conformity <i>De Minimis</i> Level	N/A	N/A	N/A	N/A	100	N/A
2002 Yuma County Emission Estimates, tons per year	40,484	9,946	7,424	517	11,522	1,734

Under the Proposed Action, operational emissions for training areas would be below conformity *de minimis* levels for Riverside County, Imperial County, and Yuma County, (Table 4). The air quality analysis only examined those F-35B training operations that occur below 3,000 feet above ground level and would produce air emissions with the potential to affect the ambient air quality. In Riverside and Imperial counties (California), F-35B training emissions in the Chocolate Mountain Aerial Gunnery Range would remain well below *de minimis* levels for NO_x, VOC, and PM₁₀. The Barry M. Goldwater Range West attains NAAQS, except in its northwest corner, which occurs within the Yuma PM₁₀ moderate nonattainment area. The ALF construction years 2014 and 2016 would overlap with F-35B operations and some remaining Auxiliary Field 2 (AUX-2) operations. The combined totals of construction and operations emissions during these years would remain well below *de minimis* levels for PM₁₀. The analysis assumes 50 percent completion of aircraft transition in 2014, and full aircraft transition in 2016 at MCAS Yuma. The net change in combined emission for PM₁₀ would be 13.29 tons per year in 2014, and 16.78 in 2016; both would be substantially below *de minimis* thresholds.

Table 4. Annual Emissions Due to Operational Activity for the Proposed Action						
Chocolate Mountain Aerial G	unnery Ro	inge (River	side and Imp	perial Coun	ties)	
Activity		Ai	r Pollutant E	missions (to	ons)	
Activity	СО	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}
F-35B Operations – Training, Riverside County	0.14	1.53	0.03	0.11	0.64	0.63
Annual Emissions	0.14	1.53	0.03	0.11	0.64	0.63
Existing Conditions	1.18	1.08	0.08	0.07	1.22	1.20
Net Change from Existing Conditions	-1.04	0.45	-0.05	0.04	-0.58	-0.57
Conformity De Minimis Level	N/A	25	25	N/A	70	N/A
F-35B Operations – Training, Imperial County	0.19	2.01	0.04	0.15	0.85	0.84
Annual Emissions	0.19	2.01	0.04	0.15	0.85	0.84
Existing Conditions	1.55	1.42	0.09	0.10	1.61	1.59
Net Change from Existing Conditions	-1.36	0.59	-0.05	0.05	-0.76	-0.75
Conformity <i>De Minimis</i> Level	N/A	100	100	N/A	70	N/A
Barry M. Goldv	vater Ran	ge West (Y	uma County)		
Activity	Air Pollutant Emissions (tons)					
Activity	СО	NO_x	VOC	SO _x	PM ₁₀	PM _{2.5}
F-35B Operations – R-2301W Training	0.34	3.54	0.06	0.26	1.49	1.48
F-35B Operations – AUX-2	2.08	0.48	0.73	0.04	0.30	0.30
F-35B Operations – ALF	16.40	97.23	0.68	7.99	7.52	7.44
Ground Vehicles – ALF	33.93	1.46	1.98	0.03	0.11	0.11
Annual Emissions	52.75	102.71	3.45	8.32	9.42	9.33
Existing Conditions	77.59	67.52	8.55	3.32	44.74	44.3
Net Change from Existing Conditions	-24.84	35.19	-5.10	5.00	-35.32	-34.97
Conformity De Minimis Level	N/A	N/A	N/A	N/A	N/A	N/A
2002 Yuma County Emission Estimates, tons per year	40,484	9,946	7,424	517	11,522	1,734

EMISSIONS EVALUATION AND CONCLUSION

Emissions associated with operations for the Proposed Action were calculated based on standardized methodologies. Emissions were then compared with *de minimis* thresholds for the air basins in which they would occur.

The Marine Corps concludes that *de minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the Proposed Action. The emissions data supporting that conclusion are shown in Tables 2, 3, and 4, which provide a summary of the calculations, methodology, data, and references included in Appendix D of the Environmental Impact Statement for the Proposed Action. Therefore, the Marine Corps concludes that the general conformity rule does not apply to the Proposed Action and a Conformity Determination is not required, resulting in this documented RONA.

RONA APPROVAL

To the best of my knowledge, the information presented in this RONA is correct and accurate and I concur in the finding that the Proposed Action is not subject to the General Conformity Rule.

Chief of Staff

Marine Corps Installations West

REFERENCES

Luker, Stacy. 2009. Personal Communication via email. Joint Strike Fighter Program Office. October.

Marine Corps Air Station, Miramar (MCAS Miramar). 2009. Final Supplemental Environmental Assessment for Military Family Housing, Marine Corps Air Station, Miramar. San Diego County, San Diego, CA. 4 December.

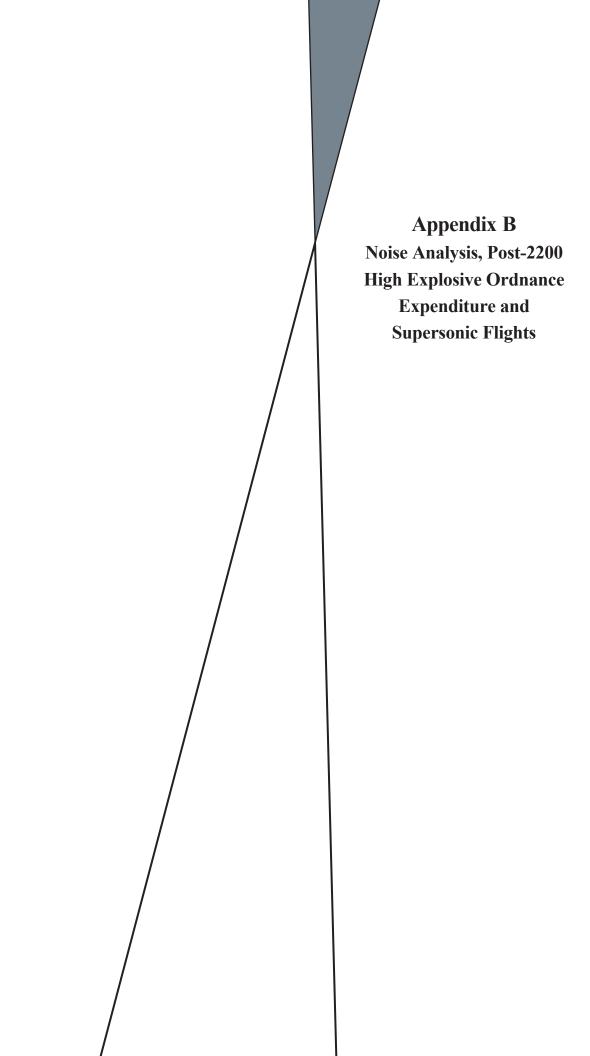
United States Environmental Protection Agency (USEPA). 2010. County Emissions Report - Hazardous Air Pollutants. Accessed at: http://www.epa.gov/air/data/ntisumm.html.

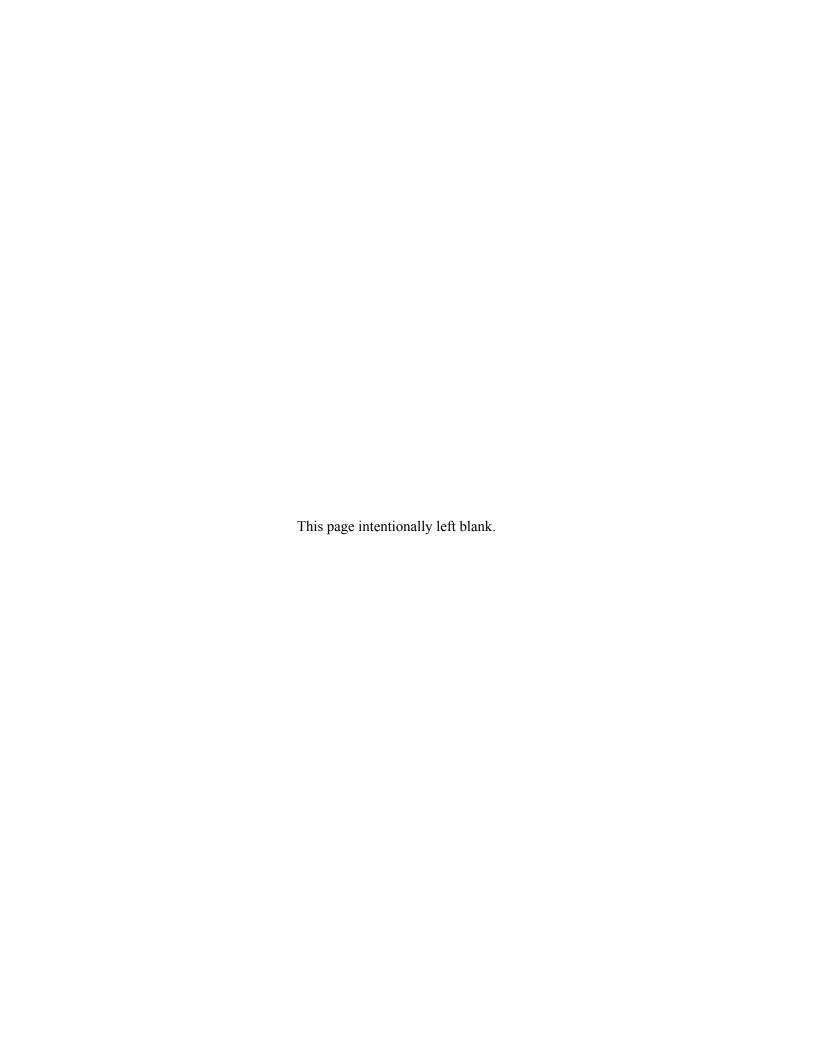
Annual Flight Operations for Chocolate Mountain Aerial Gunnery Range R-2507

Table 58. Annual Flight Operations for Chocolate Mountain Aerial Gunnery Range R-2507

				Em	issions pe	Emissions per Operation, Ibs/hour	, lbs/hour			Total Em	Total Emissions, tons/year	ıs/year	
Aircraft Engine Type Mc	ne Type of Operation	AESO Baseline Assume Operation by Type	Total Number of "Operations"	00	NOx	ЭL	\$05	PM10	CO	NOX	HC	s02	PM10
Existing AV-8B			Min site										
	Cruise - Riverside County Cruise - Imperial County	Based on low altitude sortie data provided Based on low altitude sortie data provided	1,782 2,345	62.1	24.93 24.93	1.76	<u>-</u> <u>-</u> ∞ ∞	37.35 37.35	0.92	0.37	0.03	0.03	0.55
F/A-18 A/C/D	Cruise - Riverside County	Based on low altitude sortie data provided	Minutes 3,810	8.	22.26	1.46	1.33	21.1	0.26	0.71	0.05	0.04	0.67
	Cruise - Imperial County	Based on low altitude sortie data provided	5,015	8.1	22.26	1.46	1.33	21.1	0.34	0.93	0.06	90.0	0.88
Proposed F-35B			Operations 387 Minutes										
	Cruise - Riverside County	40 minutes of cruise x 40% below 3000 feet AGL, based on approach; 43.17% in Riverside 40 minutes of cruise x 40% below 3000 feet	2,673	6.5	68.6	1.23	5.09	28.91	0.14	1.53	0.03	0.11	0.64
	Cruise - Imperial County	AGL, based on approach; 56.83% in Imperial	3,519	6.5	9.89	1.23	5.09	28.91	0.19	2.01	0.04	0.15	0.85
	GRAND TOTAL			Total Emissions, tons per year	ons, tons	per year							

Date: 30-September-2009







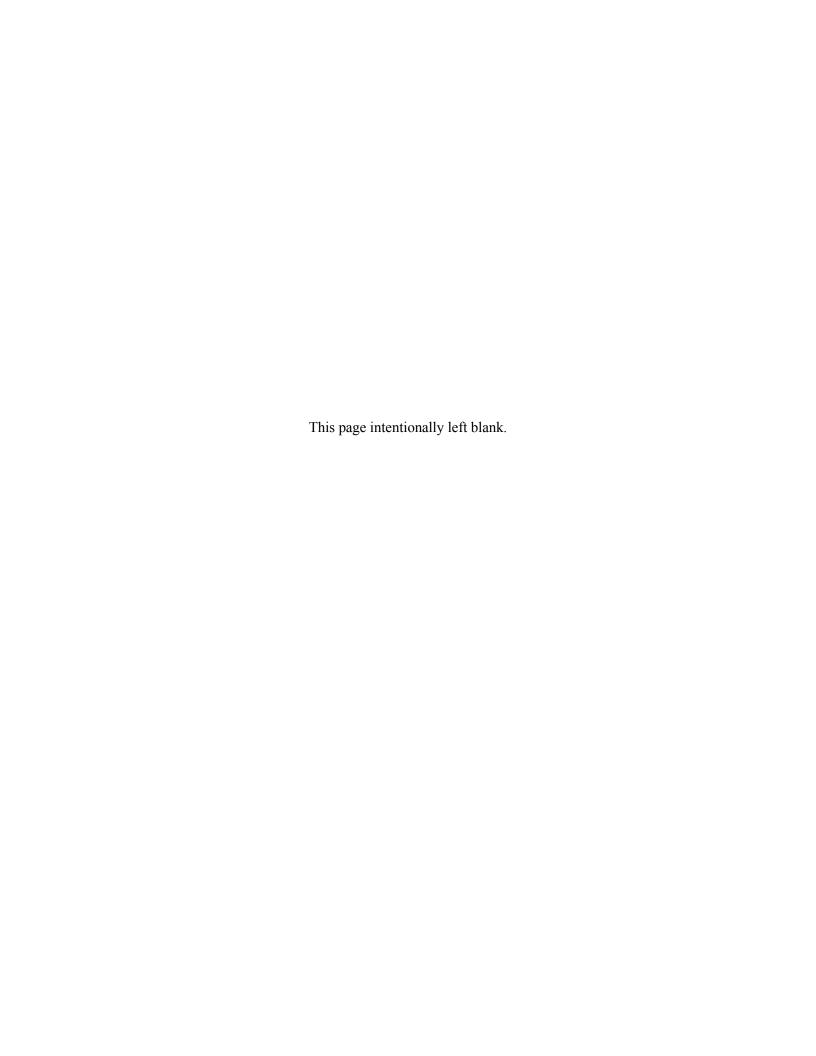
Final
Noise Analysis
for Post-2200 (10:00 P.M.) High
Explosive Ordnance Expenditure and
Supersonic Flights

Chocolate Mountain Aerial Gunnery Range, Imperial And Riverside Counties, California

June 2018

Prepared for: United States Department of the Navy





Final

NOISE ANALYSIS

POST-2200 (10:00 P.M.) HIGH EXPLOSIVE ORDNANCE EXPENDITURE AND SUPERSONIC FLIGHTS CHOCOLATE MOUNTAIN AERIAL GUNNERY RANGE, IMPERIAL AND RIVERSIDE COUNTIES, CALIFORNIA

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LIST OF ACRONYMS AND ABBREVIATIONS

A-weighted decibel	dBA	percent	%
C-weighted decibel	dBC	American Institute of Aeronautics	AIAA
Department of Defense	DoD	and Astronautics	
Environmental Assessment	EA	Arizona	AZ
High Explosive	HE	California	CA
Marine Corps Air Station	MCAS	C-weighted Day-Night Average Sound Level	CDNL
Equivalent Sound Level	L_{eq}	Chocolate Mountain Aerial	CMAGR
United States	U.S.	Gunnery Range	
U.S. Marine Corps	USMC	Community Noise Equivalent Levels	CNEL
Weapons and Tactics Instructor	WTI	decibel	dB

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CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

This Noise Analysis supports the Environmental Assessment (EA) being prepared to analyze the proposal for Post-2200 (10:00 P.M.) High Explosive (HE) Ordnance Expenditure and Supersonic Flights in the Chocolate Mountain Aerial Gunnery Range (CMAGR). Figure 1-1 depicts the location of the CMAGR, relative to southeastern California (CA), southwestern Arizona (AZ), and Marine Corps Air Station (MCAS) Yuma, AZ and other nearby ranges and special use airspace.

1.2 AREAS OF ANALYSIS

The U.S. Marine Corps (USMC) proposes to eliminate schedule restrictions on the delivery of high explosive ordnance at existing targets within the CMAGR. The USMC also proposes to authorize supersonic flight in the existing airspace overlying the CMAGR. Implementation of the Proposed Action would facilitate maintaining USMC Aviation at an optimal state of readiness to support current and emerging contingency and wartime requirements.

Implementation of the Proposed Action would facilitate maintaining USMC and other forces at an optimal state of readiness to support current and emerging contingency and wartime requirements. The USMC has identified two action alternatives: Alternative 1 and Alternative 2. Alternative 1 consists of eliminating schedule restrictions on HE ordnance deployment year-round and creating supersonic flight space within the CMAGR. Under Alternative 2, schedule restrictions on HE ordnance deployment would only be lifted during the biannual Marine Aviation Weapons and Tactics Squadron One Weapons and Tactics Instructor (WTI) Course; and supersonic flight space would also be created within the CMAGR.

1.2.1 Use of HE Ordnance after 2200 (10:00 P.M.)

HE ordnance delivery in the CMAGR from 2200 – 0600 (10:00 P.M. - 6:00 A.M.) is not currently authorized. This is based on older documentation (from 1998) that did not consider the current requirement to extend those night training hours when needed. Of note, ground-delivered ordnance (such as artillery) is not currently restricted in the same way, and can be used after 2200 (10:00 P.M.). There are two alternatives considered herein.

1.2.1.1 Alternative 1

Under Alternative 1, the current overnight scheduling restrictions for the delivery of HE ordnance at the CMAGR would be eliminated. As a result, air-to-ground HE ordnance delivery to existing targets within the CMAGR could occur at any time of the day or night, 365 days per year by legacy and new (e.g., F-35B, etc.) aircraft. However, the majority of nighttime HE ordnance expenditures would occur in the hour between 2200 and 2300 (10:00 and 11:00 P.M.) because area airfields normally close at 2330 (11:30 P.M.). The analysis herein considers all nighttime hours, but recognizes that most (or nearly all) would occur in time for aircraft recovery prior to 2330 (11:30 P.M.).

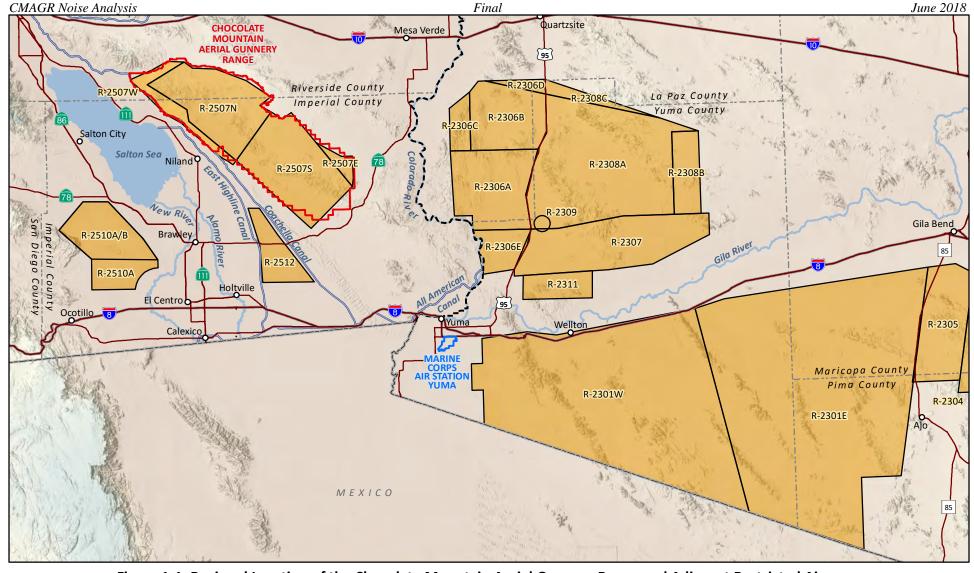


Figure 1-1. Regional Location of the Chocolate Mountain Aerial Gunnery Range and Adjacent Restricted Airspace



Alternative 1 does not propose any increase in the quantity, magnitude, target location, or type of ordnance used at the CMAGR; the USMC only proposes to change the available scheduling of ordnance use. The Proposed Action would not establish any new training ranges or target areas, or result in additional ground disturbance from current conditions.

1.2.1.2 Alternative 2

Alternative 2 consists of the same authorized use of HE ordnance at existing targets within the CMAGR. However, recognizing that the primary driver to eliminate scheduling restrictions is the WTI Course training and operations, USMC has identified a narrower action alternative in which the HE ordnance delivery scheduling restrictions are only lifted during the WTI Course. This course typically occurs twice annually and runs for 7 weeks. During the course, current scheduling restrictions would be lifted to allow for maximum overnight training flexibility. After the WTI Course is completed, the scheduling restrictions would resume.

1.2.2 Use of Supersonic Flight in the R-2507 Airspace

Restricted Area R-2507, which overlies the CMAGR, is divided into four sub-areas (North, South, East, and West). As a combined block of airspace, the proposal includes the use of this airspace for supersonic flight by those aircraft that are capable, and which have Marine Aviation Training and Readiness requirements to train for missions that require tactics that include supersonic flight. Currently, the Yuma Range Complex allows supersonic flight only in the R-2301 airspace southeast of MCAS Yuma. Adding the ability to conduct training including supersonic flight to the R-2507 (CMAGR) would allow for more flexible scheduling to more efficiently complete training requirements. Both Alternatives 1 and 2 include this aspect of the Proposed Action.

1.3 Noise Analysis Report Structure

Section 2 describes the methodology of this study. Section 3 includes the data used and the results for the post-2200 (post-10:00 P.M.) HE ordnance use under both alternatives. Section 4 includes the data used and the results for the use of supersonic flight in the CMAGR. Section 5 presents the conclusion of this study.

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CHAPTER 2 METHODOLOGY

2.1 Noise Metrics and Modeling

2.1.1 Use of HE Ordnance after 2200 (10:00 P.M.)

For aircraft flying later into the night, and employing ordnance later into the night, there are two major considerations: the first is the sound of the aircraft themselves, and the second is the sound of the HE ordnance they deliver on the range.

2.1.1.1 Aircraft Noise

For the aircraft noise component, the Community Noise Equivalent Level (CNEL) is the relevant noise metric. CNEL is the federal government standard for modeling cumulative noise exposure for aircraft and assessing community noise impacts for Department of Defense (DoD) facilities in the state of California such as CMAGR. CNEL is based on annual average daily aircraft operations.

CNEL has three time periods of interest: daytime, evening, and nighttime. Daytime hours are from 0700 to 1900 (7:00 A.M. to 7:00 P.M.) local time. Evening hours from 1900 until 2200 (7:00 P.M. until 10:00 P.M.) local time. Nighttime hours are from 2200 to 0700 (10:00 P.M. to 7:00 A.M.) local. CNEL weighs operations occurring during its evening period by adding 5 decibels (dB), and the nighttime period by adding 10 dB to their single-event sound level. This weighs the metric toward a stronger emphasis on the evening and nighttime periods due to the public's general annoyance being greater as it gets later at night. Note that "daytime," "evening," and "nighttime" in calculation of CNEL are sometimes referred to as "acoustic day," "acoustic evening," and "acoustic night" and always correspond to the times given above. This is often different than the "day" and "night" used commonly in military aviation, which are directly related to the times of sunrise and sunset, and vary throughout the year with seasonal changes.

Another very common cumulative noise metric is Equivalent Sound Level or " L_{eq} ." L_{eq} is a cumulative/average sound level over a particular duration that does not differentiate the time of day during which the sound occurs. Over 24 hours, usually called " $L_{eq}(24)$," it is the same as CNEL, except for the adjustments made in CNEL for evening and night events. Of note: for the Proposed Action, the $L_{eq}(24)$ would not change at all. This is because the proposal is defined by the total operations remaining the same, with just a time shift in a portion of the annual events causing a change in the primary metric CNEL. For that reason, the methodology for this analysis is to consider, depict, and explain the impact of a time shift on a set group of discrete events that would simply occur at a different (in this case, later) time of day.

2.1.1.2 Ordnance Noise

For the sound generated by the delivery of HE ordnance, the relevant noise metric is C-Weighted Day-Night Average Sound Level (CDNL). CDNL is used for larger impulsive noises such as those from explosions (short duration sounds with high onset-rates). "C-weighting" is used because it emphasizes the lower part of the frequency spectrum where sounds from explosions have more energy. Because of their low frequency, impulsive sounds may often be "felt" as much as they are heard. The methodology used is that the HE ordnance used overall is proportional to the operations of the aircraft dropping them. Again, the shift in time is sufficient to cause an increase in the CDNL metric, although that shift is slightly different

mathematically than the one affecting the CNEL metric for aircraft. This is due to the CDNL metric having a "weight" added to nighttime operations (after 2200 [10:00 P.M.] local), but not "evening" operations.

2.1.2 Supersonic Flight

Sonic booms are generated whenever aircraft are flying faster than the speed of sound. These may not always reach the ground, and their intensity is dependent on many factors – aircraft specifics like shape and size; flight conditions such as speed, acceleration, flight-path angle; and atmospheric conditions such as humidity, temperature, and wind. The result of a sonic boom on the ground is very similar to other impulsive sounds like those from a bomb or artillery round (although one supersonic event can result in two booms). Because of this similarity (duration, onset rate, and frequency content), the cumulative metric used to describe the overall effect of sonic booms is CDNL, which is described in more detail in Section 2.1.1, *Use of HE Ordnance after 2200 (10:00 P.M.)*.

The CDNL contribution from supersonic flight in the CMAGR was modeled with a software package called BooMap, which was designed specifically to plot the overall impact of air-to-air training by supersonic military aircraft over an area. In this analysis, version 96 of the program was used. It gives a general overall depiction of the CDNL result of a particular level of activity in an area, which has been built to match real-world, measured results of air-to-air combat training from sites on the ground scattered underneath the training area (American Institute of Aeronautics and Astronautics [AIAA] 1993).

The primary supersonic operational fighter aircraft in the USMC inventory is the FA-18 Hornet; however, the FA-18 is in the process of transitioning to the F-35B Lightning II. In addition to these two aircraft, the USMC inventory includes the F-5 Tiger II adversary aircraft. BooMap does not include the F-35B in its aircraft list. In its place, a mix of F-22 and F-16 aircraft were used. These two aircraft were selected to represent the F-35B because they best approximated the F-35B in terms of size and shape, which are key considerations in determining the CDNL impact associated with sonic booms. Specifically, the F-35B is relatively similar in size to the F-16 and similar in shape to (but smaller than) the F-22. Given that aircraft size is typically more important than shape for sonic booms, the selection of these aircraft is a reasonable (and probably conservative) approach for estimating F-35B sonic booms.

Additionally, it is anticipated that some other non-USMC aircraft may be used as adversaries for training or as participants in the WTI Courses. The most common of these is the F-16, so additional F-16 sorties were included in the model.

2.2 SCENARIOS

Effects of HE ordnance delivered after 2200 (10:00 P.M.) is considered first, in Section 3, *HE Ordnance use after 2200 (10:00 P.M.)*. Supersonic flight is considered next, in Section 4, *Supersonic Flight in the CMAGR*.

CHAPTER 3 HE ORDNANCE USE AFTER 2200 (10:00 P.M.)

3.1 AIRCRAFT NOISE

As described in Section 2.1.1.1, *Aircraft Noise*, the primary metric for aircraft noise is CNEL. The current time distribution of flight operations within the CMAGR is depicted in Table 3-1.

Table 3-1. Historical Distribution of Flight Operations at the CMAGR

Time of Day	Percentage of Total
Day (0700 to 1900 [7:00 A.M. to 7:00 P.M.])	77.5%
Evening (1900 to 2200 [7:00 P.M. to 10:00 P.M.])	17.5%
Night (2200 to 0700 [10:00 P.M. to 7:00 A.M.])	5%
TOTAL	100%

Source: USMC F-35B West Coast Basing Environmental Impact Statement (USMC 2010).

For the reasons described earlier, the Proposed Action does not involve an increase in the number of operations, but rather a change to the time distribution of the operations. In this case (shown in Table 3-1), 77.5 percent (%) of the operations are counted "as is," 17.5% of the operations are counted with a 5 dB "penalty"/adjustment, and 5% of the operations are counted with a 10 dB "penalty"/adjustment. Calculation of the increase in CNEL resulting from the Proposed Action is dependent only on what percentage of sorties shift into the nighttime period.

Another assumption is that the evening period is currently the most constrained under the current rules – due to scheduling training for darkness on the front end, and the end of HE ordnance dropping capability (2200 [10:00 P.M.]) on the back end. Therefore, this analysis assumes that the increase in the "nighttime" period would come from sorties and ordnance that would have otherwise happened in the daytime. That is – evening operations would continue to consume 17.5% of operations in the 3-hour evening timeframe, while the increases to nighttime would come from daytime. This assumption is conservative in that it results in a bigger impact on the primary metric, CNEL.

The next question is how many sorties can be fit into the nighttime period, if the assumption is made that the aircraft would land before local airfields close at 2330 (11:30 P.M.). While a short term "surge" with dedicated effort to fly as much as possible in that extra hour and a quarter of nighttime might result in some large operations numbers, it is realistic to assume that the nighttime period might (on average) absorb an additional number of sorties. Probably no more than half of what is normally absorbed in the 3-hour evening period. This equates to an additional 8-9% of annual sorties being moved from day to night. This estimate may be high, given that there are day requirements that would not go away, but it likely does not understate the effect.

Table 3-2 shows the CNEL increases (measured in dBA) that would result from shifting air operations from day to night in 1% increments.

Operations Percentage Day Evening Night % Shift Day to **CNEL Shift** (0700 to 1900 (1900 to 2200 (2200 to 0700 Night (dBA) [10:00 P.M. to [7:00 A.M. to [7:00 P.M. to 7:00 P.M.]) 7:00 A.M.]) 10:00 P.M.]) 0% 77.50% 17.50% 5% 0 1% 76.50% 17.50% 6% +0.22% 75.50% 17.50% 7% +0.33% 74.50% 17.50% 8% +0.54% 17.50% 9% 73.50% +0.75% 72.50% 17.50% 10% +0.871.50% 17.50% + 1.0 6% 11% 7% 70.50% 17.50% 12% +1.18% 69.50% 17.50% 13% +1.39% 68.50% 17.50% 14%

Table 3-2. Effect on CNEL from Shifting Day Operations to Night Operations

To reiterate – the CNEL changes in Table 3-2 do not depend on the total numbers of sorties flown. It assumes that the total operations stays the same (with the same mix of aircraft), and the variation is caused only by more of those aircraft staying on the range later to take advantage of the proposal to eliminate the time restriction on air-delivered HE ordnance. The other notable assumption is that the evening sorties stay the same (because of being already time-restricted). New nighttime sorties are taken from current daytime sorties, making the impact to the CNEL metric the largest.

17.50%

+1.4

+1.5

15%

3.1.1 Alternative 1

10%

67.50%

Under Alternative 1, the 2200 (10:00 P.M.) restriction on the use of HE ordnance would be lifted all year. Moving up to an additional 10% of total current sorties (throughout the year) from before 1900 (7:00 P.M.) to after 2200 (10:00 P.M.) results in a CNEL increase of up to 1.5 dBA. Just for demonstration purposes, in order to generate a 3 dB shift, 29% of all sorties would have to occur after 2200 (10:00 P.M.) vice the current 5%.

3.1.2 Alternative 2

The two annual WTI Courses are conducted for 7 weeks each – although the flight phases are slightly shorter than that. However, even including the full 14 weeks per year would mean that the total sorties per year moving from day into night would be less than in the case of Alternative 1. It has been shown under Alterative 1 that unless 29% of the total annual airspace operations are flown during acoustic night (after 2200 [10:00 P.M.] local time) throughout the year, the change in CNEL is less than 3 dB – so anything less than that under Alternative 2 would have a lower CNEL.

Normal airspace noise evaluation with the CNEL metric often uses the "busiest month" for the evaluation rather than the average of the entire year. If that standard was applied, that would mean that the busiest month would still be during the WTI calendar timeframe, so Alternatives 1 and 2 would be much more similar.

3.2 ORDNANCE NOISE

As described in Section 2.1.1.2, *Ordnance Noise*, the primary metric for impulsive (HE) ordnance noise is CDNL. The current HE ordnance use breakdown for the R-2507/CMAGR airspace is as shown in Table 3-3.

Table 3-3. Historical Annual HE Ordnance Use in the CMAGR

	Bombs (250-2,000 pounds)	Air-Ground Missiles	Cluster munitions	Rockets
CY14 TOTAL	2099	41	67	6282
CY15 TOTAL	2390	103	38	12544
CY16 TOTAL	2182	109	28	10498
Average	2224	84	44	9775
CY14 WTI	817	19	8	2780
CY15 WTI	811	51	0	2885
CY16 WTI	466	60	0	2270
Average	698	43	3	2645

Note: CY = Calendar Year. *Source:* MCAS Yuma 2018.

For the reasons described earlier – the Proposed Action does involve a change in the number of HE ordnance events, only the time distribution (since the types and numbers of each is not going to change under the Proposed Action). Ordnance usage data is not recorded with a time of use, so the assumption is that the ordnance use is proportional (for an entire year) to the time distribution of the aircraft carrying/employing it. For this, we therefore used the time of day distribution of the aircraft in Table 3-1: with day/evening/night distributed as 77.5%/17.5%/5%.

Similarly, to the CNEL shifts calculated and shown in Table 3-2, the CDNL shifts for time change in HE ordnance delivery are shown in Table 3-4. The changes in decibels are different, because the CDNL metric, by federal standard, does not recognize the "evening" time period as distinct. This actually places more weight in the shift from day to night.

Table 3-4. Effect on CDNL from Shifting Day Operations to Night Operations

	Operations	Percentage	
% Shift Day to Night	Day (0700 to 2200 [7:00 A.M. to 10:00 P.M.])	Night (2200 to 0700 [10:00 P.M. to 7:00 A.M.])	CDNL Shift (dBA)
0%	95%	5%	0
1%	94%	6%	+ 0.3
2%	93%	7%	+ 0.5
3%	92%	8%	+ 0.7
4%	91%	9%	+ 1.0
5%	90%	10%	+ 1.2
6%	89%	11%	+ 1.4
7%	88%	12%	+ 1.6
8%	87%	13%	+ 1.8
9%	86%	14%	+ 1.9
10%	85%	15%	+ 2.1

The table shows that at the expected overall night increase that may max out at 8-9% of total sorties additional nighttime (day to night shift), the CDNL change is less than 2 dB. This was based on expected aircraft scheduling constraints due to field closure times. Even with a tripling of nighttime aircraft operations (from 5% of total to 15% of total), the CDNL shift is shown in Table 3-4 to be 2.1 dB. In other words, a 3 dB change in CDNL would not occur until there is a 16% increase in operations from day to night. The 24% change in flight operations that would cause a 3-dB change in CNEL (due to aircraft noise) would result in a 4-dB change in CDNL (due to the ordnance noise).

To put this into context, Figure 3-1 shows the existing CDNL contours for aviation-delivered HE ordnance in the CMAGR. Note that a 2-4 dB increase in these contours would not come close to exceeding the boundaries of the range complex at the 62 dbC level (shown in light blue), which is the lowest level that would trigger any land use recommendations for surrounding communities.

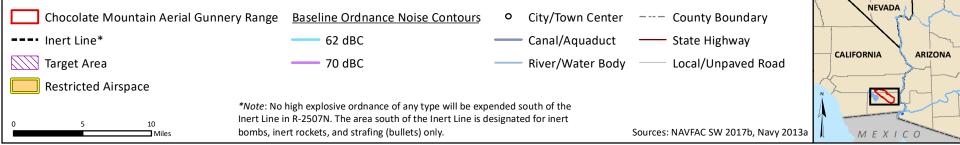
3.2.1 Alternative 1

Full use for the entire year with up to 24% of total sorties being converted to night (so that 29% of all aviation activity on CMAGR was after 2200 [10:00 P.M.]) would result in CDNL impacts of 4 dB or less, none of which would result in overall CDNL levels of 62 dB extending off the CMAGR range area.

3.2.2 Alternative 2

Partial use of the nighttime periods only during WTI Course would have even less impact than presented for Alternative 1.

Figure 3-1. Baseline C-weighted Noise Contours



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CHAPTER 4 SUPERSONIC FLIGHT IN THE CMAGR

4.1 MODELING DATA

The noise modeling methodology for CDNL contribution of sonic booms was explained in Section 2.1.2, *Supersonic Flight*. The requirement for supersonic operations under Alternatives 1 and 2 are generic and in keeping with requirements for the supersonic flight regimes dictated by the published tactics, techniques and procedures associated with standard Marine Aviation Training and Readiness operations for air-to-air combat training events. The BooMap 96 software is geared toward providing cumulative impacts, given that multiple, repetitive actions by aircraft in air-to-air training engagements are not always predictable in specifics – so a collective approach is warranted and supported by the analysis offered by the software.

Table 4-1 shows the aircraft types modeled. This is based on a monthly total, to include "Red Air" (rival/adversary aircraft roles used in training). The sortie totals on a monthly basis are based on the expectation that the R-2507 airspace (above the CMAGR) is used as an augment to the other supersonic airspace available in the Yuma Range Complex (namely the R-2301).

Table 4-1. Aircraft Modeled for Supersonic Flight in R-2507/CMAGR Airspace

Aircraft	Modeled Aircraft	Number of sorties per month
F/A-18	F/A-18	40
E 25D	F-22	20
F-35B	F-16	20
F-5	F-5	40
F-16	F-16	20
TOTAL		140

4.2 RESULTS

The modeling output of BooMap is not specific to individual events or conditions, but correlated to long-term effects during the course of a year. The modeling results assume an air-to-air training condition with supersonic flights occurring at various altitudes and various headings/directions within the airspace. Supersonic flights would be oriented primarily around a major axis aligned with the long axis of the airspace dimension and multiple shorter minor axis perpendicular to the major axis. As shown in Figure 4-1, the major axis would run from the southeast to the northwest. Supersonic operations could occur at all elevations within the airspace, but for the most part would occur over 25,000 feet above mean sea level and generally last no longer than approximately 2 minutes.

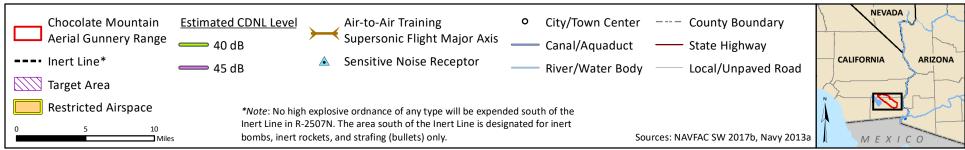
Figure 4-1 depicts the CDNL contribution from the proposed supersonic activity in the CMAGR. At the extremes of the airspace, supersonic operations would result in a CDNL of 40 dB. This would result in a negligible impact to the CDNL levels because the addition of 40 dB to an existing noise environment at 62 CDNL would result in a 62.03 CDNL.

Salton Sea

Figure 4-1. Sonic Boom Noise Contribution from Proposed Supersonic Flights

Calipatria

Westmorland



Similarly, if the areas formerly subjected to a CDNL of 62 dB (see Figure 3-1) were increased by 2 dB due to the increase of night operations, and another 0.03 dB for the additional supersonic operations, the total would still only increase by about 2 dB. Referring to Figure 3-1, it is easy to see that the difference is both negligible, and would be contained within the CMAGR. While certain training and atmospheric conditions could result in noise being heard off-installation (consistent with current training), the demonstrated negligible increase in noise levels would not come close to exceeding established noise impact thresholds.

4.3 CONCLUSION

From a cumulative noise perspective, the contribution of post-2200 (10:00 P.M.) HE ordnance deliveries and sonic booms on the CMAGR would be negligible when compared to the existing noise environment. This is because both noise sources would generate noise levels far below the threshold for community noise impacts within their respective noise metrics, while still within the range boundaries. Given that noise attenuates over distance, noise levels outside the CMAGR would be even lower.

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CHAPTER 5 REFERENCES

AIAA. 1993. Modeling the Sonic Boom Noise Environment in Military Operating Areas. AIAA 93-4432. October.

Cardno. 2018. Modeling Results BooMap 96. February.

MCAS Yuma. 2018. Email correspondence with Mr. John Gordon. January.

USMC. 2010. USMC F-35B West Coast Basing Final Environmental Impact Statement. October.

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